March 1934

TECHNOLOGY REVIEW

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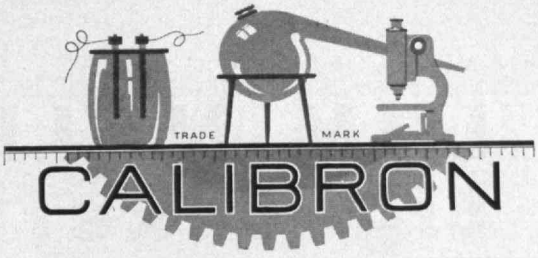
THE TECHNOLOGY REVIEW, March, 1934. Vol. XXXVI, No. 6. Published monthly from October to May inclusive and in July at 10 Ferry Street, Concord, N. H. Publication date: twenty-seventh of the month preceding date of issue. Annual subscription $3.50; Canadian and Foreign subscription $4.00. Entered as second-class matter at the Post Office at Concord, N. H., under the Act of March 3, 1879.

THE TABULAR VIEW

PROFESSOR FREDERICK K. MORRIS in the opening article of this issue emphasizes the importance of geology in our history, and he writes as a geologist of wide experience. He has taught at Columbia University, served as adviser in geology to the Department of State in Washington, and carried on extensive field work in California. For a number of years he was in China, where he studied in most of the northern Provinces and served as consultant to several large companies. He founded a department of geology at the Government Engineering College in Tientsin and set up a laboratory for making thin sections of rock in order to complete his studies. In 1922 he was invited to join the Central Asiatic Expeditions into the Gobi Desert of the American Museum of Natural History and completed the field work in 1925. With his colleagues he has taken part in the subsequent research work and has contributed to several large volumes of the results. One volume is still in preparation. In 1927 he was appointed to the Department of Geology in this Institute. Since coming here his chief work has been in the study of the origin and history of the crystalline rocks and of their structures as seen in the field and in the laboratory.

AT the present time JOHN P. ELTING, '31, is the holder of the Alfred P. Sloan ('95) Automotive Research Fellowship at Technology, and the studies of gasoline engine combustion which he describes by text and illustration on page 218 *f.* relate to the work he has pursued in holding this fellowship. Readers will recall Mr. Elting's striking photographs which have been reproduced in recent issues of The Review. ¶ RALPH T. JOPE, '28, is Business Manager of The Review and J. RHYNE KILLIAN, JR., '26, is Editor. They acknowledge with gratitude the help given them by many college financial officers, by retiring President HAROLD S. BOARDMAN, '96, of the University of Maine, and the American Association of University Professors.

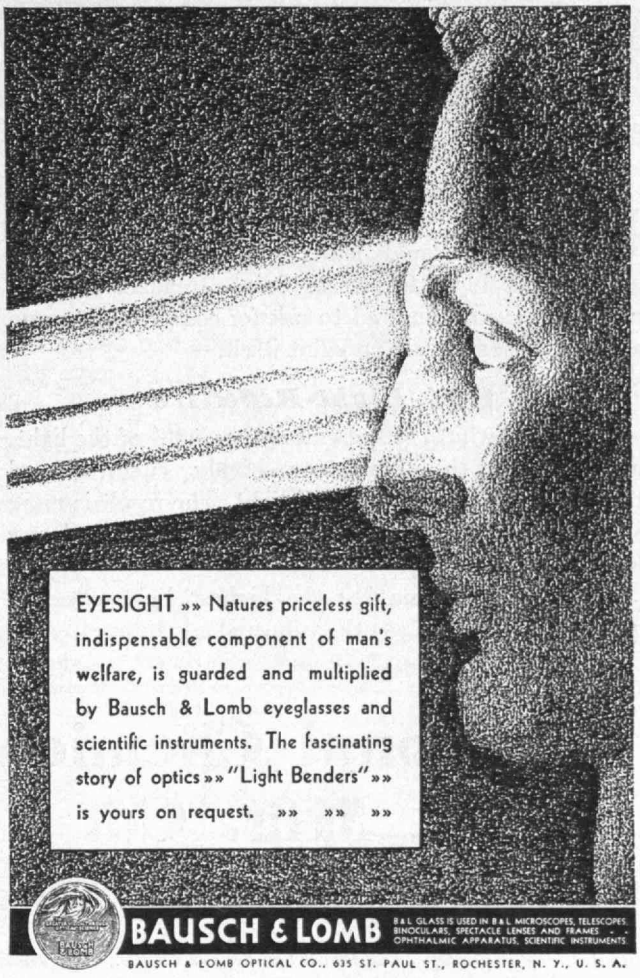
ONE of America's distinguished chemists, ARTHUR D. LITTLE, '85, is also one of our most gifted scientific expositors; his spoken and published papers are always marked by lucidity and charm. Dr. Little was active in founding this magazine and this fact always adds to the pleasure with which he is published in these pages. His article on plastics, beginning on page 222, was originally presented at a joint symposium entitled "The Chemical Revolution," held by Sections C and K of the American Association for the Advancement of Sciences. Other articles recently contributed by Dr. Little to The Review include "Research and Labor," December, 1929; "New Lamps for Old," October, 1931; "The Handwriting on the Wall," January, 1926; "The Fifth Estate," November, 1924; and "The Place of Chemistry in Business," May, 1923. ¶ The interesting shadow pictures of water waves, on pages 226 and 227, were contributed by CLARENCE A. DYER of the Department of Physics, Ricker Classical Institute and Junior College.

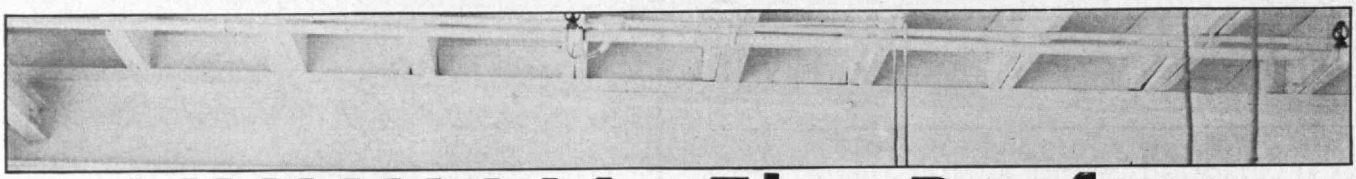


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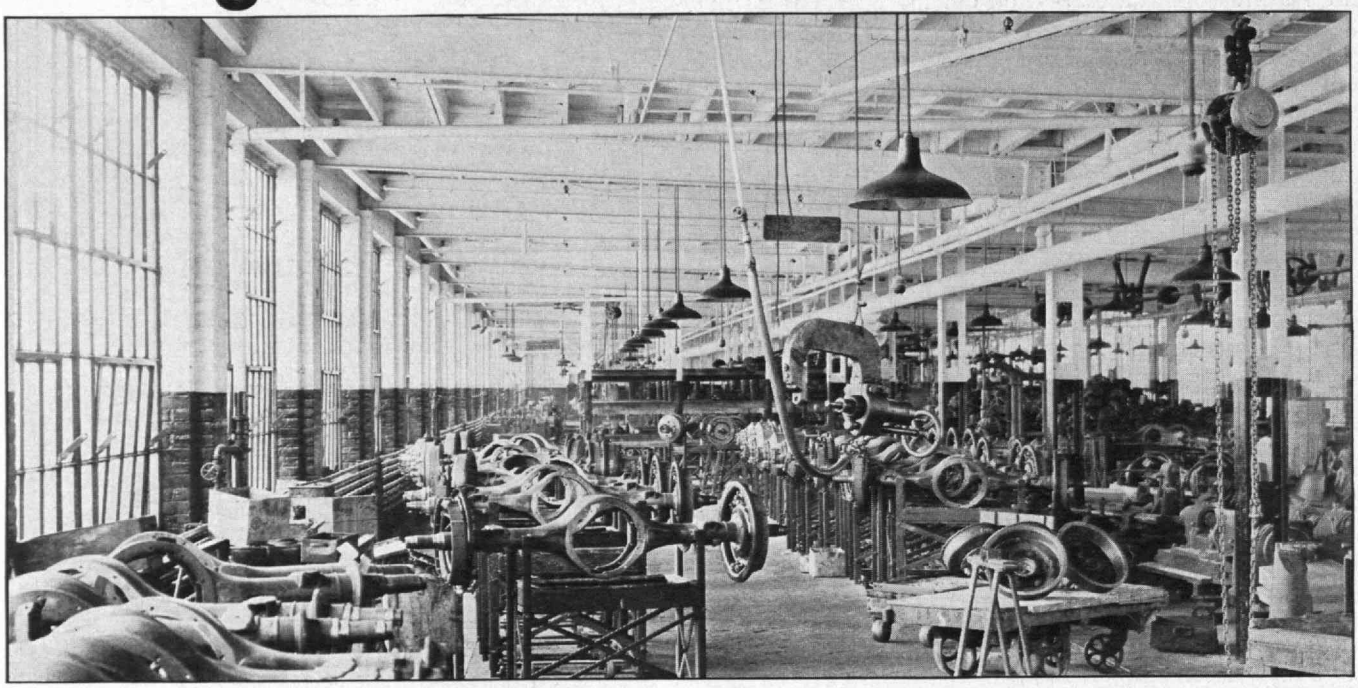
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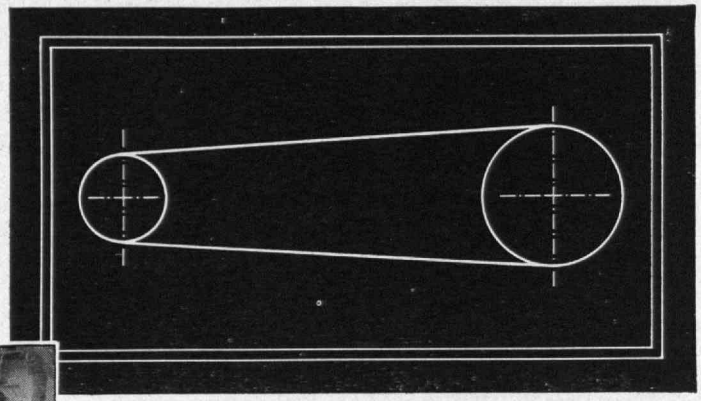
NORTON
POROUS MEDIUMS

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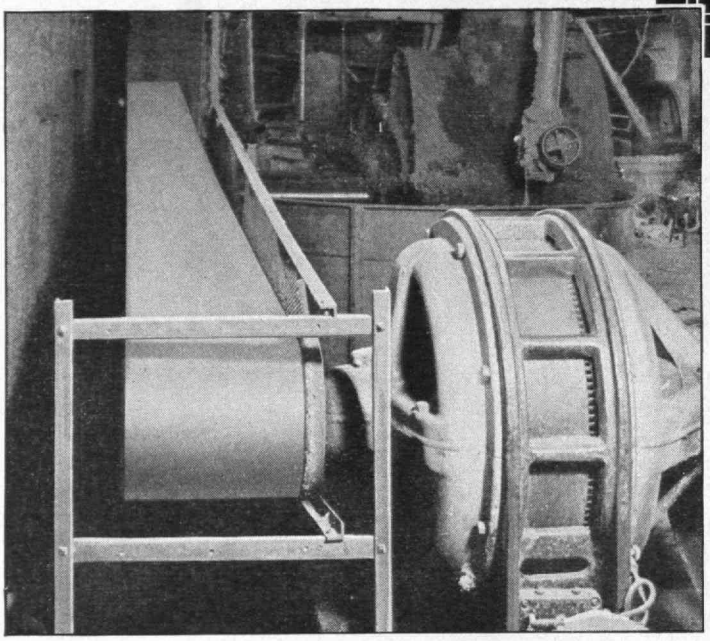
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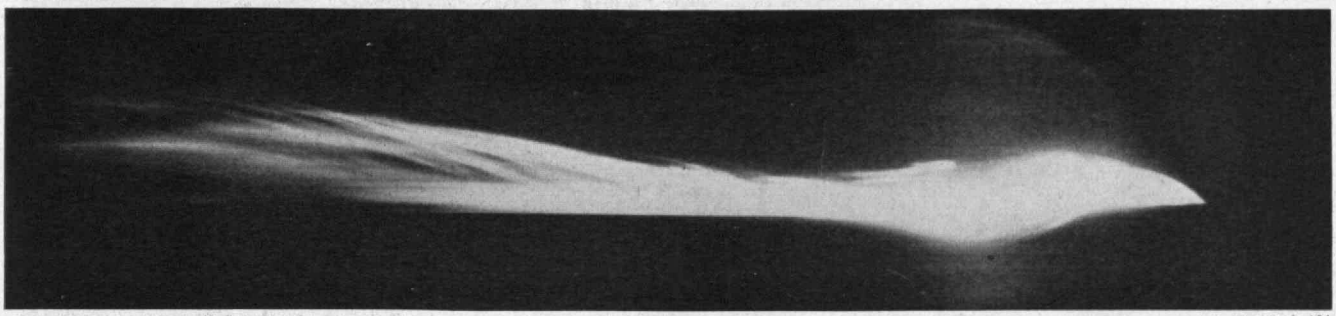
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The Technology Review

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EDITED AT THE MASSACHUSETTS INSTITUTE OF TECHNOLOGY



John P. Elting, '31

This resembles a surrealist painting of almost anything, including a bird, but actually it is a flame photograph showing combustion in the cylinder of an internal combustion engine. *See page 218.*

CONTENTS

Vol. 36 MARCH, 1934 *No. 6*

THE COVER *From a photograph* By Frank H. Conant
Oil Derricks

INVESTMENTS IN POWER Frontispiece 214

GEOLOGY AND MINING IN THE COLONIES By Frederick K. Morris 215
The Geological Stage on Which America's Pageant of Colonial Progress Developed

ENGINE COMBUSTION CAUGHT IN THE ACT By John P. Elting 218
What Happens When Your Automobile Engine Fires

ACADEMIC ECONOMICS By Ralph T. Jope and J. Rhyne Killian, Jr. 220
Effects of the Depression on the American College

PROTEAN PLASTICS By Arthur D. Little 222
New Materials "Wax to Receive and Marble to Retain"

THE TABULAR VIEW 209
Notes on Contributors and Contributions

THE TREND OF AFFAIRS 225
News of Science and Engineering

THE INSTITUTE GAZETTE 231
Relating to the Massachusetts Institute of Technology

Editor
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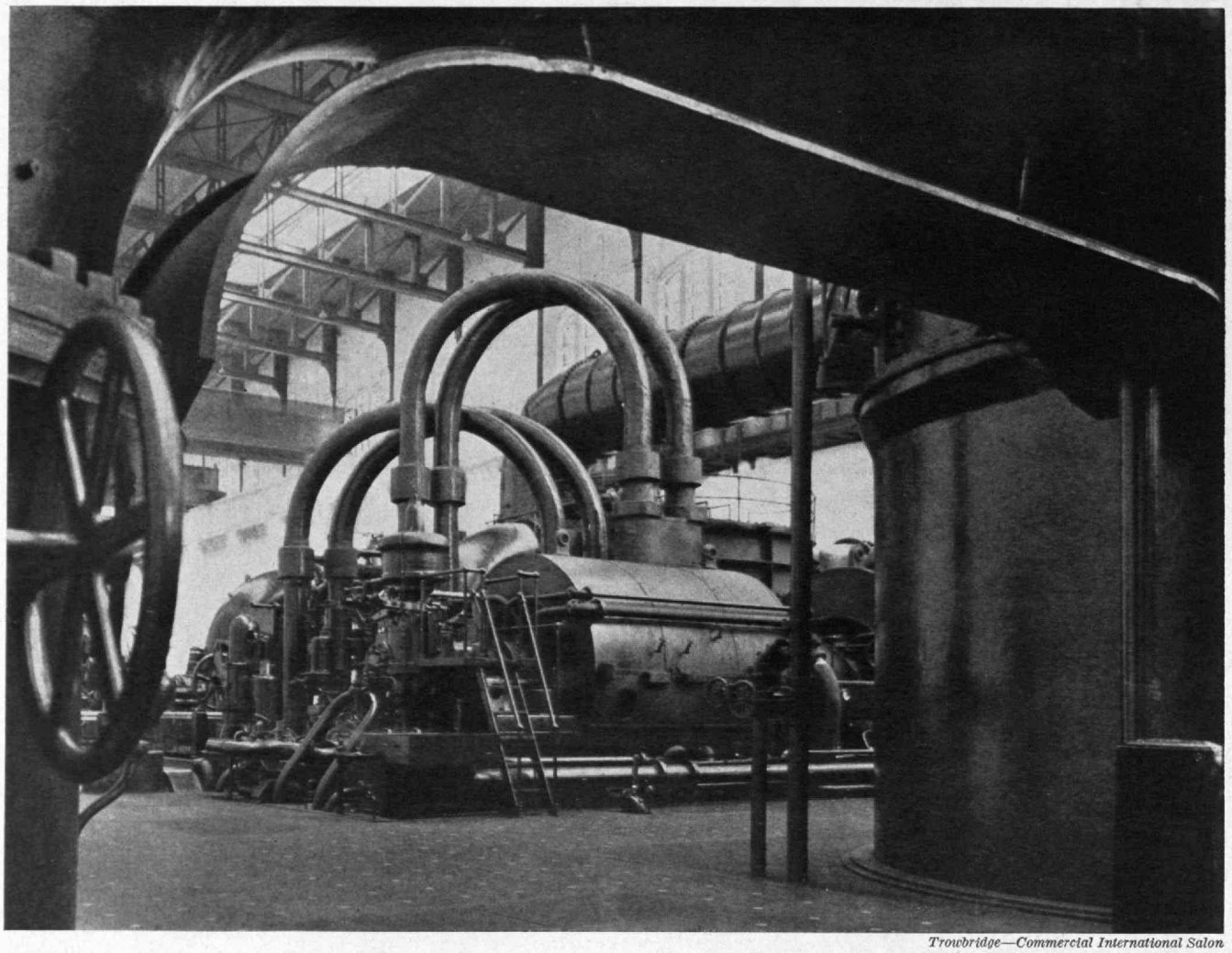
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PUBLISHED MONTHLY FROM OCTOBER TO MAY INCLUSIVE AND IN JULY ON THE TWENTY-SEVENTH OF THE MONTH PRECEDING THE DATE OF ISSUE AT 50 CENTS A COPY. ANNUAL SUBSCRIPTION $3.50; CANADIAN AND FOREIGN SUBSCRIPTION $4.00. PUBLISHED FOR THE ALUMNI ASSOCIATION OF THE M. I. T. REDFIELD PROCTOR, PRESIDENT; HARRISON P. EDDY, JR., EDWARD L. MORELAND, VICE-PRESIDENTS; CHARLES E. LOCKE, SECRETARY; J. RHYNE KILLIAN, JR., TREASURER.

PUBLISHED AT THE RUMFORD PRESS, 10 FERRY STREET, CONCORD, N. H. EDITORIAL OFFICE, ROOM 11-203, MASSACHUSETTS INSTITUTE OF TECHNOLOGY, CAMBRIDGE A, MASS. ENTERED AS SECOND-CLASS MAIL MATTER AT THE POST OFFICE AT CONCORD, N. H. COPYRIGHT, 1933, BY THE ALUMNI ASSOCIATION OF THE MASSACHUSETTS INSTITUTE OF TECHNOLOGY. THREE WEEKS MUST BE ALLOWED TO EFFECT CHANGES OF ADDRESS. BOTH OLD AND NEW ADDRESSES SHOULD BE GIVEN.



Trowbridge—Commercial International Salon

Investments in Power

It has been estimated that in the electric light and power business $12,800,000,000 is invested in power generation and distribution. The investment of the individual householder is possibly in excess of $150

THE
TECHNOLOGY
REVIEW

Vol. 36, No. 6

March, 1934

Geology and Mining in the Colonies

The Geological Stage on Which America's Pageant of Colonial Progress Developed

By Frederick K. Morris

EARLY GEOLOGICAL FALLACIES — THE DIVERSE SERIES OF BELTS WHICH THE COLONISTS FOUND — REMARKABLE DISTRIBUTION OF ORES — AN IRON CIVILIZATION — THE REVOLUTION'S IMPETUS TO MINING — ADVENT OF COAL BURNING — FIRST HINT OF PETROLEUM — FRANKLIN AND THE MASTODON

DURING Colonial times, there was not a body of scientific thought on geology, as there was on physics, astronomy, and medicine. Here and there earnest and able men were laying the foundations on which the next century was to build a science; but these workers had as yet little influence, and few followers; and the scattered ideas that did cross the all too broad Atlantic to the Colonies were chiefly errors.

Descartes, Leibniz, Kant, and Laplace had reasoned out a nebular hypothesis which, though untenable, is still stoutly maintained by many geologists — so young is our science. In 1749 and in 1778 Buffon published books based upon genuine observations whose echoes influenced Benjamin Franklin. Late in the Eighteenth Century, the German mineralogist, Gottfried Werner, set back the hands of the clock by teaching with vast authority that all rocks were chemical precipitates from a universal ocean. Even basalt and granite were called precipitates, though their true volcanic nature had been pronounced by earlier writers in Germany and France. Werner's excellent publicity and his faithful disciples made his influence felt in America where there were many German colonists. His great opponent, James Hutton of Scotland, did not publish his essentially correct and almost modern views until 1797 — long after the Colonies had become states, and were just beginning to be a nation.

Let us glance swiftly at the geological stage on which the pageant of Colonial progress developed. Along the Atlantic seaboard stretches a broad belt of soft clays, gravels, sands, and weak limestones. They lie almost horizontally, forming an immense coastal plain. The northern part of the plain is under sea-water and is called the "fishing banks" of New England and Canada. The Coastal Plain first appears above sea-level in Cape Cod, Nantucket, Martha's Vineyard, Long Island and Staten Island. Then joining the mainland, it extends as a broadening belt through all the coastal states to Mexico. With its deep bays and abundant harbors, its fertile soils and smooth slopes, the Coastal Plain is one of the most inviting countries that could be offered to sea-weary immigrants. Thin layers of brown iron-ore lie in some of the swampy valleys.

West of the Coastal Plain there is a broad belt of old crystalline rocks — granites, gneisses, and schists — extending from Canada into Georgia. It is called the

Older Appalachian Mountains. The coastward portion is broad and low and has been carved into thousands of rounded hills. Southerners call this country the Piedmont, and we may extend the name to include the crystalline rocks of New England outside of the high mountains. Many rivers which drop from the strong Piedmont onto the soft Coastal Plain form waterfalls and provide the power which the colonists used at Trenton, Philadelphia, Wilmington, Baltimore, Washington, Raleigh, and other early towns. On the inland side of the Piedmont the ancient crystalline rocks rise into a rugged highland, two to six thousand feet above sea level. The Older Appalachians contain ores of iron, zinc, lead, nickel, copper, and a little gold.

Thick masses of brown sandstone and red shale, interspersed with lava-flows and intrusive sheets of black basalt, were laid out in ancient lowland basins. Our Earth, like a skilled maker of mosaics, opened long splits in the Piedmont, and neatly sunk the sandstone-shale-basalt masses into the old crystalline rocks; so that today we abruptly enter these younger brownstone lowlands as we travel over the older crystallines. In the once-hot basalts, or in the sandstones near them, the Earth's hot juices had concentrated a little copper ore. And here the colonists found native copper and even a little silver; and with them the bright blue and green crystals which the Indians used for paints, and which the white man recognized as ores of copper. Almost all of the early copper mines were in the brownstone lowlands.

On the western side of the crystalline Highland, there is a long belt of folded mountains made entirely of sediments — limestones, shales, and sandstones. They are called the Younger Appalachian Mountains in contrast to the Older Appalachians. Close to the Highland the Younger Appalachians consist almost wholly of weak limestones and shales which have weathered out to form a lowland — even though it is made of folded rocks and was meant by Nature to be a mountain range — an easily-traveled corridor nearly 2,000 miles long and rarely more than 20 miles wide. We call it the Great Appalachian Lowland. With its fertile soils and abundant water, it is one of our richest food-lands and early attracted the inland settlers. Iron ores with smaller amounts of lead and zinc are found in the limestones.

West of the Great Lowland the Younger Appalachians are long, high ridges of hard sandstones containing almost our entire stock of anthracite coal.

Beyond these lies a wilderness of rugged plateau country which for many years formed the most serious barrier to westward migration that our forefathers encountered. To this day the Allegheny Plateau remains one of the least thickly populated areas of the Eastern United States; yet it contains the largest bituminous coal field in the world, and almost in the very coal beds there are ores of iron carbonate — one of the easiest ores to smelt. The Plateau also contained our greatest oil field — possibly unequalled in the world for quality.

West of the Plateau are the broad prairie plains which the colonists were just beginning to win during the last half-century of Colonial times.

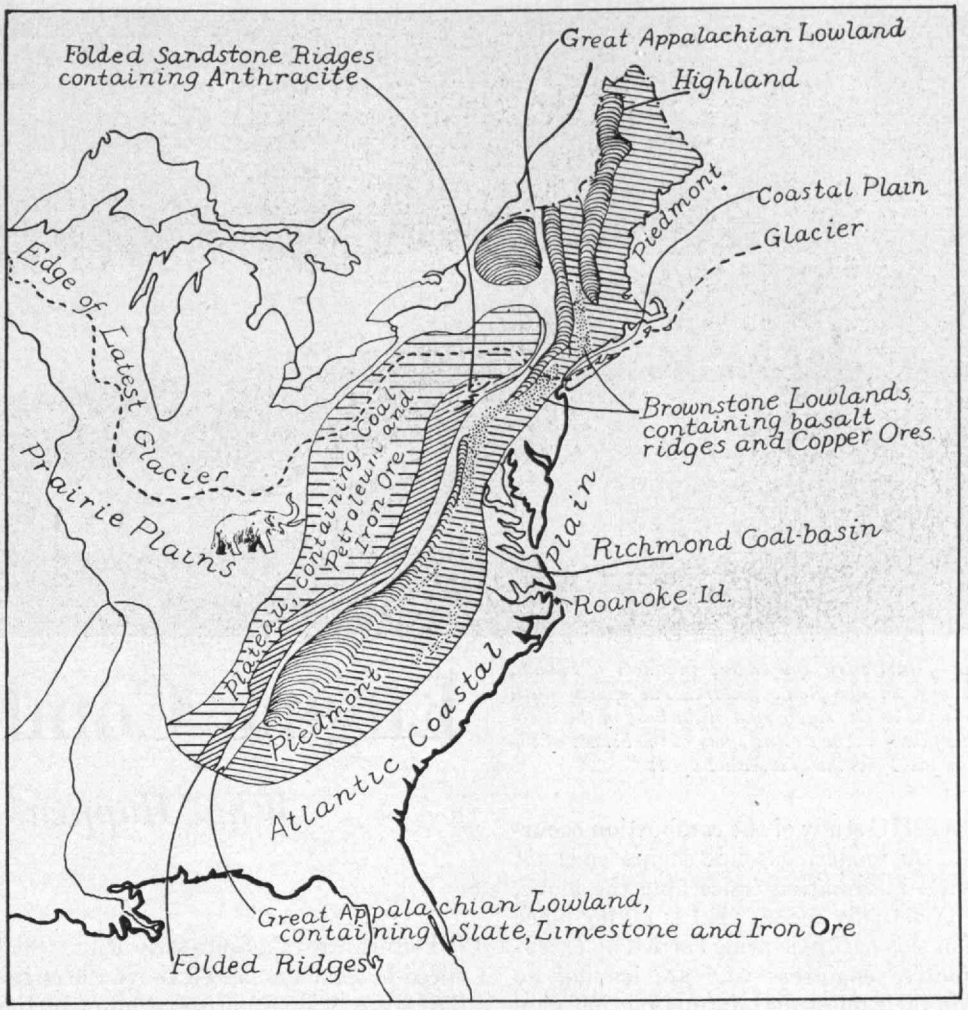
The ice of the great glacier had covered the northern portion of the country, and had left it full of lakes and swamps and piles of bouldery drift and terraces of gravel and sand. The lakes and swamps contain bog-iron ore. The ice and its boulder-clay had diverted many rivers from their pre-glacial courses and spilled them over the hard rocks, forming numerous waterfalls: and water-power was Nature's invitation to the pioneers. The southern limit of the ice extended from Nantucket and Long Island across northern New Jersey and the northernmost edge of Pennsylvania. South of this line there are almost no lakes, and all of the soils are deep and free from boulders.

THUS the land which the immigrants found was a series of belts, diverse from one another in rocks, soils, topography, and resources. Such a country offered a challenge to the ingenuity of Man, and the opportunity for a home-made civilization. Those who like to believe in a beneficent Providence will marvel at the distribution of the ores. The colonists needed iron more than any other metal; and near the coast were small, shallow bog-iron ores, which they dragged from the lakes and swamps with rakes or with small dredges. Their next greatest need was copper — and behold the many bright blue and green ore-bodies in and near the black basalts in the brownstone lowlands. The larger ores, the vast coal fields, and the rich oils were reserved in the rugged interior for later needs as the country grew. To New England, of the short-growing season and the stony glacial soils, was given the abundant water power and — for that day — abundant ores, as a natural impetus toward manufacture. And the deep rich soils and long crop season of the South was compensated by comparative poverty in metals.

The traces of gold along the rivers that drain the Older Appalachian crystallines did not escape the sharp eyes of the early Spanish explorers. Ponce de Leon, in 1513, Diego Miruelo in 1516, and DeSoto in 1539 found gold and hoped for much more.

Thomas Herriot found the first iron when he searched for gold on Roanoke Island in 1585. His chief, Sir Walter Raleigh, shrewdly remarked that the iron ore would form a profitable ballast for ships returning to England. In 1608, 17 tons of crude iron, mined and smelted in Virginia, sailed proudly eastward to England. In 1620 Berkeley built an iron plant on Falling Creek in the Piedmont of Virginia. The machinery had traveled slowly from far-off England and was bravely beginning its task; but in 1622, the Indians murdered the colonists and threw the machinery into the river — the eternal struggle of the lesser races to prevent the achievements of which they are themselves incapable.

Massachusetts was scarcely behind Virginia in her rate of development. During the 1630's every blacksmith smelted a little ore, and in 1643 John Winthrop the Younger built an iron plant at Lynn, using bog-iron ore from the glacial lakes and swamps. Meanwhile the Dutch were finding ores of copper and iron in New York. By the latter end of the Seventeenth Century a chain of Dutch and German mines extended along the Appalachians in New York and Pennsylvania. With the opening of the Eighteenth Century a much richer period began. In 1701, and again in 1709, the Simsbury mine was opened in the brownstone lowland of Connecticut, west of Hartford. It is one of the oldest copper mines in



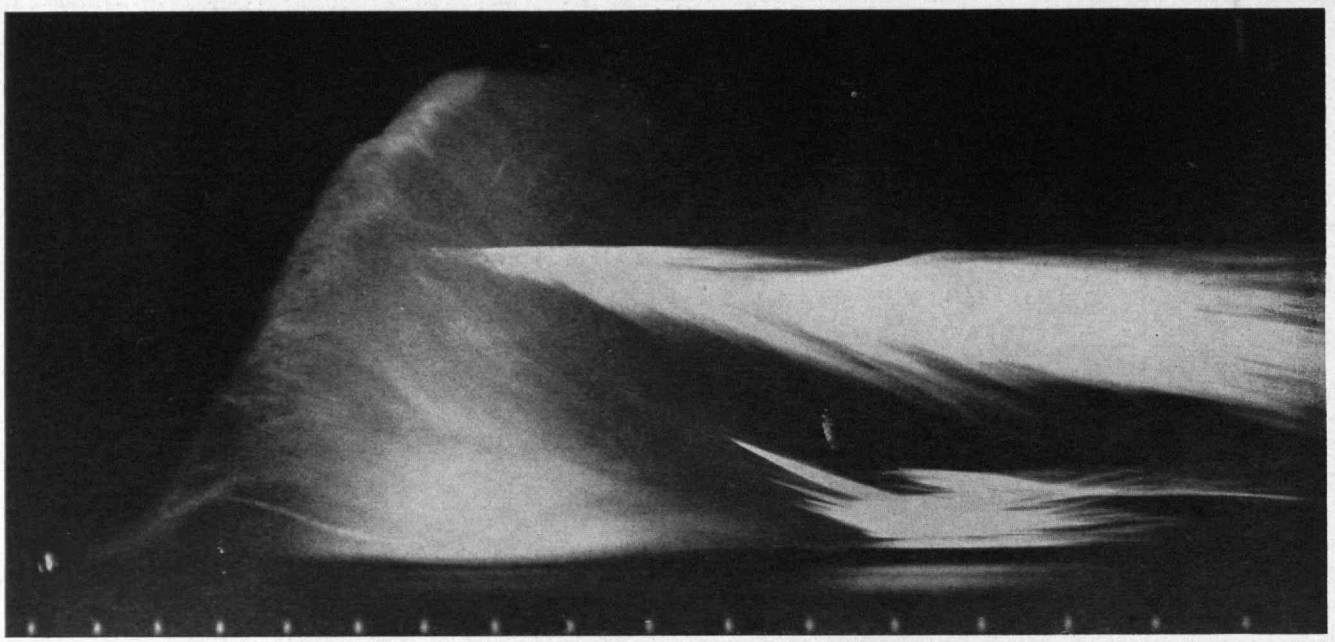
The American Colonies occupied belts of very diverse lands. The Coastal Plain consists of soft clays, sands, and gravels, with a little bog-iron ore. In the strong crystalline rocks of the low Piedmont and the rugged Highland, the Colonists found ores of iron, zinc, lead, and gold. The Brownstone Lowlands, shown as dotted areas, contain ores of copper, silver and lead. The Great Appalachian Lowland offers soft brown iron ore, most of our zinc deposits, and abundant limestone for flux. The Folded Ridges consist of sandstone and limestone with red iron ore, and, in Pennsylvania, our largest supply of anthracite coal. The high and rugged Plateau of sandstone and shale contains petroleum, gas, bituminous coal, and a little iron ore. North of the broken line marked "Glacier," the country is dotted with lakes and swamps containing bog-iron ore. The Mastodon stands over the Big Bone Lick

America; but was closed during the Revolution, and was used as a prison, until mining was resumed in 1830. The Salisbury iron mines in the crystalline schists of Litchfield County, Connecticut, were opened in 1734, and were active during the Revolution. Benjamin Franklin sent one of his Franklin Stoves to Robert Grace, who built stoves like it at Reading furnace in 1742. The same furnace cast guns for the Continental Army.

Almost all of the Colonial metal industry lay between Virginia and Massachusetts, but the Carolinas produced most of the gold. Some gold was also washed from the rivers that drained the southern part of the crystalline Highland and the Piedmont as far south as Alabama, Virginia, and even New Hampshire panned gold in the river gravels. But we can look with pride, and perhaps with thankfulness, too, upon the fact that our early Colonial civilization was characterized by iron and not by gold — even as we can be thankful that the English Colonies were homelands rather than forts and trading stations.

From the very beginning the colonists required two grades of iron — steel for tools and wrought iron for utensils and nails. At that time no nation smelted iron with coal, but the forests gave them abundant charcoal, and they used sea shells for flux where they lacked limestone. There was plenty of brawn to beat iron into shape; and since there was plenty of water-power to work the simple wooden bellows of the early cold-blast furnaces and the rolling and slitting mills, the iron industry was somewhat mechanized even in its infancy. Little casting was attempted, and no wonder; for casting requires higher temperatures than the colonists could master with their simple furnaces. The first record of casting is dated in Philadelphia in 1727, though it is said that John Winthrop's furnace at Lynn cast pots "directly from the ore" in 1643. Europe had practised casting for two centuries before America tried it.

The second half of the Eighteenth Century extended the metal production and the technique of the Colonies. In 1750, the first coal was (*Continued on page 236*)



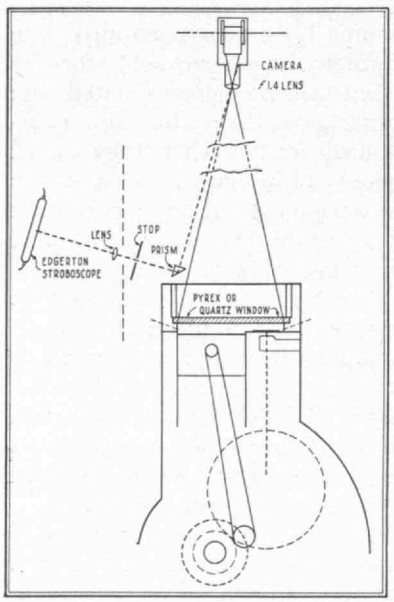
Normal combustion of fuel in a gas engine produces a smooth, graceful curve as shown in this flame picture. The spark which ignited the mixture is the small, single spot at the base of the curve on the left side of the picture. The timing spots at the bottom of the picture are 1/500ths of a second apart

Engine Combustion

What Happens When Your

BY JOHN

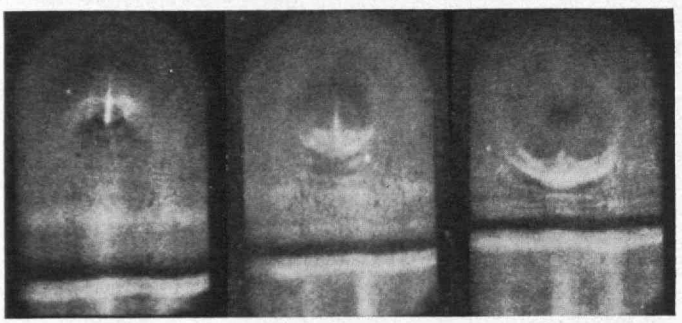
A PHOTOGRAPHIC study of the combustion occurring within the modern gasoline engine leads not only to vital information concerning the flame, but is a method of actually seeing what is taking place inside. Research of this nature is being carried on extensively by automotive engineers who are leaving no stones unturned in their quest for information that may be used to improve the present automobile engine. Few problems yield a more fascinating and varied assortment of picture data. The pictures presented here are but a few from the many hundred taken in the Aeronautical Engine Laboratory at M.I.T. No two flame records appear exactly alike, but certain characteristics are common to all.

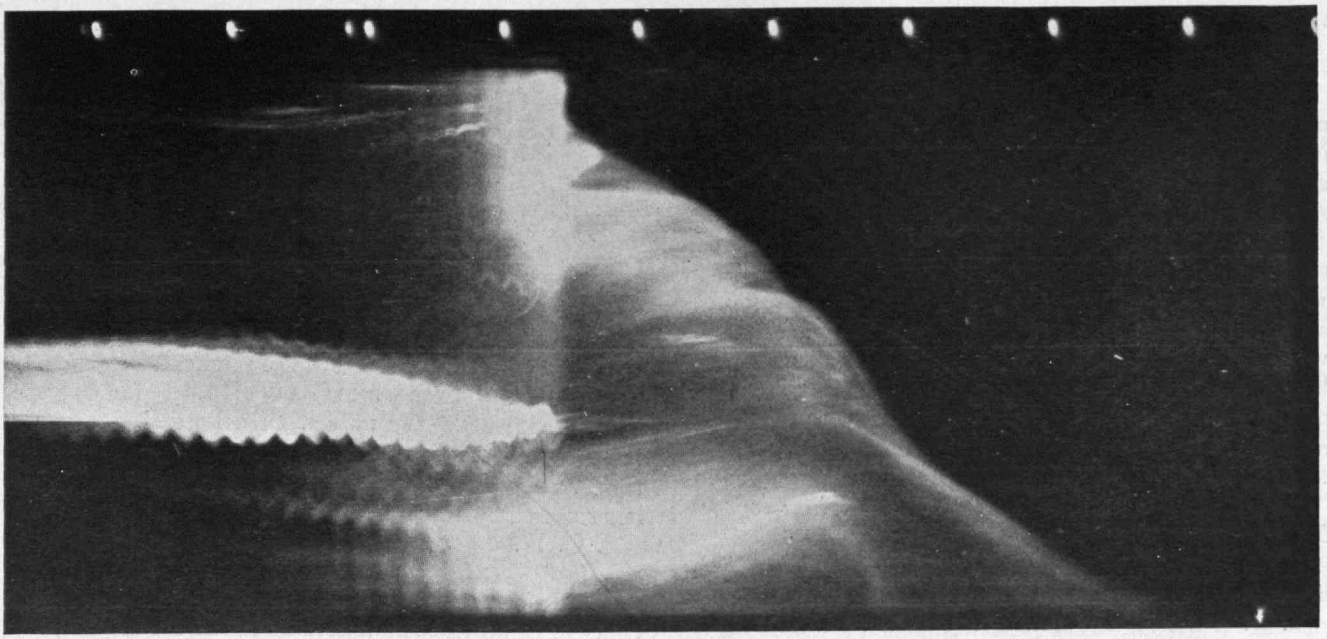


Left: *Relative positions of camera and engine. A timed spark or Edgerton stroboscope is used to put the timing spots on the film.* Right: *Waves of water in a tank (see page 226) are analogous to the pressure waves in a combustion chamber. The plane wave progressing from the square end of the chamber (at bottom of pictures) corresponds to the initial pressure rise traveling across the chamber after detonation*

Pictures are taken on a strip of film which moves at high speed in a camera placed above the engine (see adjacent diagram). A long, narrow window in the cylinder head of the engine allows light from the flame to reach the camera. The spark occurs at one end of the window and so records itself on the film. Following the occurrence of the spark, there is a delay before the flame appears. The flame then moves along the window as it passes to the far end of the combustion chamber. A sketch is shown on the opposite page which illustrates how, if the photographic film in the camera is moved in a direction at right angles to the direction of the motion of the flame along the window, the position of the flame is recorded continuously on the film. After the flame front has reached the end of the combustion chamber, burning continues in the hot gases.

The familiar knock, or detonation, is the very rapid burning of a portion of the gases within the cylinder. This sudden burning occurs in the portion of the





Compare the above picture illustrating "knock" in an engine with normal burning as seen on the opposite page. Rapid burning of a portion of the cylinder charge in an engine produces, as shown above, the sharp deviation from the smooth normal record. The sound wave or knock causes the wavy form of the flames

Caught in the Act

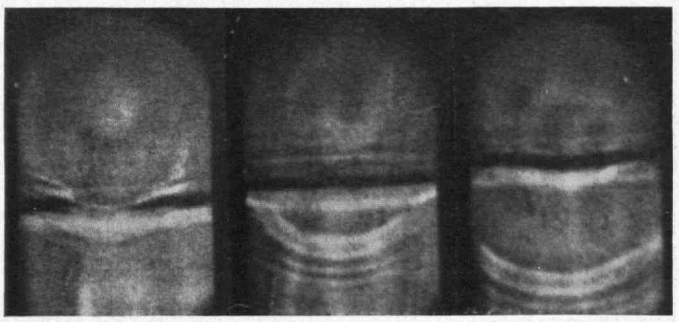
Automobile Engine Fires

P. ELTING

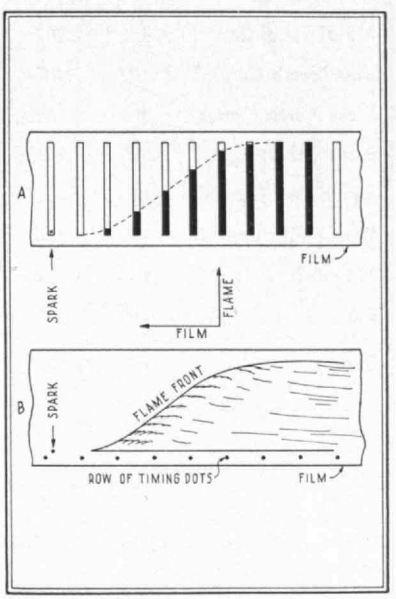
combustion chamber which is most remote from the igniting spark, and is shown vividly in the flame picture at the top of this page. The sound, or knock, which is heard as a result of the detonation, originates as a sound wave in the combustion chamber (see page 228). This sound wave is started by the sudden local pressure rise due to the very rapid burning of the gases in the detonation zone. A pressure wave traverses the length of the chamber many times, each time displacing the gas molecules a small distance. Those portions of the gas which are luminous at the time of the passage of the pressure wave are photographed, thus resulting in the wavy or serrated appearance of the flames after detonation has taken place.

In order to facilitate measurements, a time scale is photographed on the film simultaneously with the flame record. This time scale is the row of dots appearing at the top or bottom of each picture. The space between each spot represents the distance the film has moved during 1/500th of a second. Using this time scale, the velocity of the flame as well as the time between the occurrence of the spark and any position of the flame may be determined. By such measurements the many flame photographs may be compared. Changes in the ratio of fuel to air, spark advance, and engine speed produce the largest changes in the appearances of the flame records. Both the initial delay, or lag, after the spark, and the maximum velocity are changed.

The Research in this field is being carried on at M.I.T. under the Alfred P. Sloan ('95) Automotive Fellowship grant, and is a part of the general program which included development of the detonation meter described on page 228.



Right: *High-speed motion pictures taken of the flame through a slit-like window result in a series of individual images of the window showing the flame at different positions (A). With the film moving steadily rather than intermittently, the series of individual images merge into one continuous record (B).* Left: *A complex set of waves such as here pictured is found to exist in a gasoline engine*



Academic

Effects of the Depression

By Ralph T. Jope and

YEAR after year since 1929 the depression has nibbled away at the budgets of research and educational institutions. In a few instances it has all but swallowed the entire income. In a majority of institutions and colleges salaries have been cut, and almost everywhere staffs have been decreased and research curtailed. But how much?

To this question, often asked in educational and scientific circles, and usually answered in a fragmentary way,* we have, by assembling data from a variety of sources, formulated a more complete reply. That he who reads may run, we have summarized our findings by answering six specific questions which, taken together, afford a picture of the changes which have affected institutions in the educational and scientific field.

1. Q. *How much has the income of American colleges been reduced since 1929–1930?*

A. Publicly controlled institutions (data from 54), 40%; privately endowed (data from 125), 31%.**

2. Q. *What reduction in teaching and administrative personnel has occurred since 1932–1933? Since 1930?*

A. A survey of institutions both public and private, conducted by the United States Office of Education, indicates a reduction of 4.2% since last year (see Table II). A special survey of the American Association of University Professors (see Table I) indicates a percentage of faculty drop since 1930 of 7.9% for private institutions; 6.9% for public. Of collateral interest is the fact that employment in industrial research laboratories, according to the National Research Council, has suffered a decrease since 1930 of 34%.

3. Q. *What has been the range of reductions in college salaries?*

A. "Information collected by the United States Office of Education shows that 96 out of 136 institutions are cutting the salary scale of 1933–1934 below the scale of 1932–1933. Forty institutions, or 30%, are not making cuts. A year ago information collected by the Office of Education from 110 institutions indicated cuts in 79 and no cuts in 31. The proportion not making cuts a year ago was 29%, almost exactly the same as the proportion this year. Unfortunately, a large proportion of the institutions not making cuts have avoided them by making staff reductions.

"The salary reductions during the current year are substantially greater than those of last year. Last year, for example, more than one-third of the cuts were less than 10%. This year only 17, or one-eighth, of the cuts are less than 10%. Last year more than half of the cuts were made on a graduated scale, which meant in nearly every instance a higher percentage reduction for the men receiving higher salaries. This year only 21 out of 96 institutions have cut on a graduated scale. The largest proportion of flat cuts this year probably is due partly to the fact that graduated cuts were made last year and this year's cuts are superimposed upon last year's." *

* Frequently repeated is the story of North Dakota. On January 1, 1932, all salaries there were reduced 20% plus a sliding scale of decreases ranging from 1% on a salary of $80 per month to 20% on a salary of $150 per month. In addition, a maximum limit of $1,920 per year was set for salaries of the instructional staff.

** Estimated by authors from published data of United States Office of Education.

* From report prepared by Professor Sumner H. Slichter for the Committee on Economic Conditions of the American Association of University Professors.

TABLE I

Reductions in Faculty in Colleges and Universities

(since 1930)

Locality (Census District)	Number of Institutions Reporting	Total Faculty	Number Dropped	Per Cent of Faculty Dropped	Number of Institutions Dropping None
New England	19	2,061	107	5.2	9
Middle Atlantic	42	7,767	431	5.5	19
East North Central	50	5,480	547	10.0	13
West North Central	32	2,758½	194	7.0	5
South Atlantic	39	2,448½	192	7.9	18
East South Central	17	1,300	143	11.0	2
West South Central	14	1,350	102	7.6	4
Mountain	15	1,374½	133	9.7	5
Pacific	18	2,840	180	6.3	5
Total	246	27,379½	2,029	7.4	80
Total private institutions	181	14,364½	1,130	7.9	63
Total public institutions	65	13,015	899	6.9	17

Reprinted by courtesy of the *Bulletin* of the American Association of University Professors.

TABLE II*

Staff Changes

1932–1933 compared with 1933–1934

	Number of Institutions	Size of Staff	No Change in Staff	Increase in Staff	Decrease in Staff	Net Change in Staff	Percentage of Staff
1932–1933	244	25,041	134	33	108	−413	−1.6%
1933–1934	321	24,587	128	46	157	−1,100	−4.2

It will be observed that staff increases were over twice as large as a year ago.

*This table and the two on the opposite page are drawn from a report prepared by the Committee on Economic Conditions (Sumner H. Slichter, Chairman) of the American Association of University Professors.

Economics

on the American College

J. Rhyne Killian, Jr.

Some specific examples: University of Florida, reduction for president 20%, for deans and other members of the staff 10%; University of Michigan, president and deans 11%, professors 7%, associate professors 5%, assistant professors 4%, instructors none; University of Washington, president 31%, professors 29%, associates 23%, instructors 15%.

4. Q. *To what extent has research been curtailed?*

A. A special survey of colleges, conducted by the authors (covering 18 large institutions), shows a decrease of 25% since 1929–1930. Data, derived from statistics published by the United States Office of Education and covering 34 institutions, show a decrease of 21.3% since 1929–1930; 13.7% since 1932–1933. Of collateral interest is the fact that scientific funds included in the 1934 Federal budget are cut 4% under 1933 and 34.5% below the $43,375,000 spent on research during the fiscal year 1931–1932.

5. Q. *What has happened to college registration?*

A. The American Association of Collegiate Registrars reports a decrease since 1932–1933 for 581 institutions of 3.6%. The largest decrease (5.2%) appeared in the group of institutions classed as universities, while the junior colleges showed an increase of 9%. In the various curricula, the largest relative losses were experienced in pharmacy (16.7%), mines (10.8%), engineering (10.5%), business administration (9.9%), agriculture (9.3%), and art (9.3%). Remarkably enough, architecture showed a gain of 17.2%, and small gains occurred in chemistry, law, medicine, music, and nursing. Graduate school registration showed a decrease of 0.1%.

6. Q. *How much have gifts to educational institutions decreased?*

A. A compilation of all publicly announced philanthropic gifts in six large American cities, made by the John Price Jones Corporation, shows that in 1933 gifts to educational institutions totaled $14,552,988, as against a total of $59,498,928 in 1932. Of the 1933 figure, $10,496,160 was announced in the form of bequests, while in 1932, $46,486,990 was in bequests. Publicly reported direct gifts in 1933 amounted to only $4,056,828. In 1932 educational institutions were the greatest benefactors, outstripping any other form of philanthropy, but in 1933 publicly announced gifts to education were exceeded by those for organized relief, health, and miscellaneous reform.

7. Q. *How many colleges have lowered their fees?*

A. Of 214 institutions reporting on this item through the Association of American Colleges, 114 have reduced tuition or living expenses, or both. "The majority, however, are maintaining their tuition fees, which have never met the cost of instruction, and are reducing to the minimum the price of board and room. . . . One administrator wrote that over 50% of the new students were receiving some special concession."

TABLE III

Two-Year Summary of Salary Changes in American Colleges

1932–1933 to 1933–1934

		No Cut	*1–4%*	*5–9%*	*10–14%*	*15–19%*	*20–29%*	*30% and over*
58 publicly controlled institutions*	9	1 F	1 F	13 F	7 F	7 F	0 F	
		0 G	6 G	3 G	3 G	1 G	2 G	
78 private institutions	31	1 F	6 F	19 F	4 F	6 F	5 F	
		0 G	2 G	0 G	0 G	4 G	0 G	
All 136	40	2 F	7 F	32 F	11 F	13 F	5 F	
		0 G	8 G	3 G	3 G	5 G	2 G	

1931–1932 to 1932–1933

57 publicly controlled institutions	14	1 F	9 F	9 F	0 F	0 F	0 F
		2 G	5 G	12 G	1 G	3 G	1 G
53 private institutions	17	0 F	6 F	5 F	0 F	0 F	1 F
		2 G	2 G	11 G	5 G	4 G	0 G
All 110	31	1 F	15 F	14 F	0 F	0 F	1 F
		4 G	7 G	23 G	6 G	7 G	1 G

F refers to flat cuts
G refers to graduated cuts, classified according to their maxima
* Five publicly controlled institutions made graduated cuts, but did not report the amount.

TABLE IV

Distribution of Salary Changes in American Colleges

1932–1933 to 1933–1934

Amount of Cut	*Number of Institutions Making Given Change in Salary, out of —* 58 Public Universities and Colleges	78 Private Institutions
No cut	9	31
Cuts graduated according to salary received in 1932–1933, but amount not specified	5	0
Flat cuts:		
less than 5%	1	1
5 but less than 10%	1	6
10 " " " 15%	13	19
15 " " " 20%	7	4
20 " " " 25%	2	3
25 " " " 30%	5	3
30% and over	0	5
Total	*29*	*41*
Cuts graduated up to given amounts		
Less than 5%	0	0
5 but less than 10%	6	2
10 " " " 15%	3	0
15 " " " 20%	3	0
20 " " " 25%	0	2
25 " " " 30%	1	2
30% and over	2	0
Total	*15*	*6*
Grand total	58	78

Protean Plastics

New Materials "Wax to Receive and Marble to Retain"

By Arthur D. Little

MANY years ago Lord Byron expressed his admiration for those qualities which distinguish modern plastics, when he wrote:

"His heart was one of those which most enamour us,
Wax to receive and marble to retain."

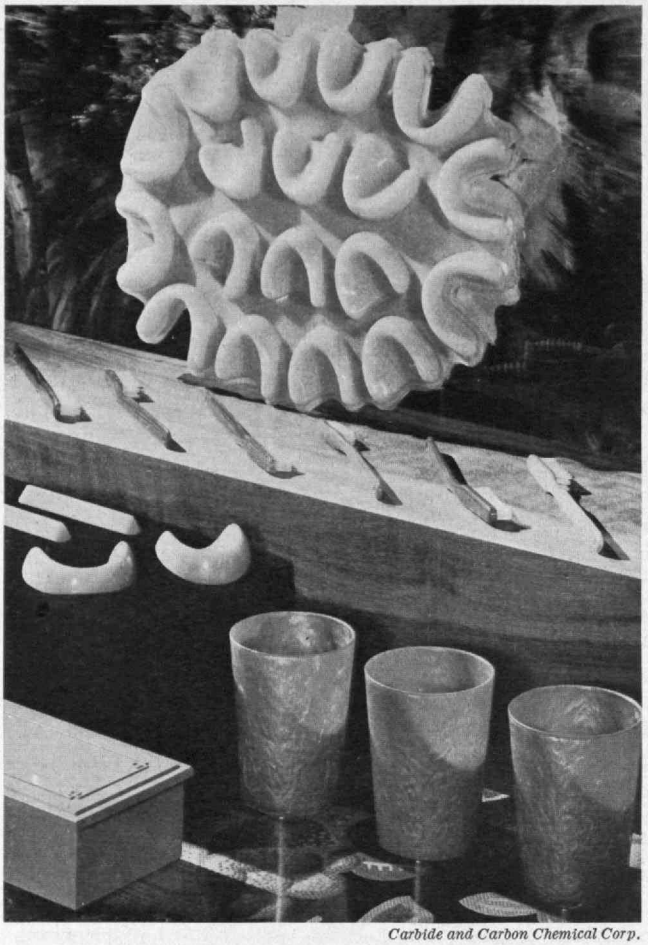
This combination of properties, so obviously desirable where hearts are concerned, has now become available to us in many forms of inanimate matter. It is, therefore, not surprising that the materials exhibiting them are rapidly finding such general and diversified application that we seem to be entering upon the Age of Plastics.

The shards of prehistoric pottery testify to man's early utilization of the plastic property of clay which, during the ages, has progressively found higher and broader applications which have culminated in the incomparable productions of the Chinese potters and the immensely important ceramic industries of today.

Glass must, in a sense, be regarded as a plastic, and there are specimens of such antiquity that we depend on legend to account for its discovery. Glass making is today in a remarkable period of renaissance in which household articles of use and beauty, laboratory apparatus, chemical plant equipment, and materials of construction are produced in great volume and of extraordinary cheapness. A single machine turns out 400 lamp bulbs a minute, and another makes bottles as fast as 200 men once made them. Translucent glass bricks are now produced in quantity, and the day of the glass house is so near that stone throwing will soon be inexpedient.

Bitumen is another plastic of which man made very early use. There was, near Babylon, a great asphalt lake, and the bricks of the walls and palaces raised by Semiramis and the Kings of Babylon were bonded with asphalt cement. An inscription of about 600 B.C. records that Nabopolassar, the father of Nebuchadnezzar, "made a road glistening with asphalt and burnt brick," which we may assume to be the earliest asphalted block pavement. Today the plastic property of bitumen is utilized in many of our major industries, from the making of battery boxes and pipe conduits to road building and the fabrication of roofing and other materials of construction.

Shellac has long been used in the molding of buttons and similar small articles and more recently for gramophone records, into which one-half the world's production of shellac now goes. The effects of research and invention upon specific industries are often far reaching, and the directions in which they reach are sometimes diametrically opposed. Edison's phonograph brought prosperity to the Indian collectors of shellac. The synthesis of indigo ruined those other Indians who were growers of anil from which indigo was extracted.

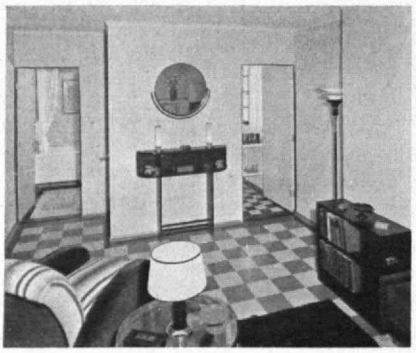


Carbide and Carbon Chemical Corp.

Above: *Multiple denture casting of vinylite as removed from mold. Pearl-essent tumblers and cigarette box are standing on chintz impregnated with vinylite hot pressed on composition board.* Below: *A living room. Vinylite used for wall panels, doors, cups, dishes, cigarette boxes, and door knobs*

Casein, derived from skim milk by precipitating the curd with acid or preferably by rennet, is a comparatively modern plastic which is of interest, although of minor industrial importance. In the best practice the dry powder is slightly moistened and then molded into small articles which have, after hardening with formaldehyde, the general appearance of celluloid.

The modern plastics industry is, however, differentiated from most of the foregoing by the fact that it depends for its raw materials upon synthetic products such as the esters of cellulose and the great number of remarkable synthetic resins of which Bakelite is the prototype.



Although rubber is a plastic of immense industrial importance, it is not commonly included in that branch of the plastics industry which we are now considering; but just as rubber gained its place in industry

through Goodyear's discovery that it could be vulcanized by sulphur, so the plastics industry in its more specialized form began with the discovery by Hyatt, in 1869, that nitrocellulose could be plasticized by camphor. The product, which he named celluloid, found its initial use in dental plates, but its field was soon extended to include the celluloid collars which we have forgotten and the great variety of articles with which we are all familiar. The adaptation, by Goodwin, of the celluloid film as a base for photographic emulsions quickly displaced the more cumbersome glass and not only revolutionized photography but made possible the moving picture.

Viscose, or cellulose xanthate, which was discovered by Cross, Bevan and Beadle of London, in 1892, seemed at first to open an extraordinarily broad field for useful application since, in effect, it provided a means for making cellulose both water-soluble and plastic. The compound is made by treating cellulose in the form of purified wood pulp or cotton linters with caustic soda and carbon disulphide. By means of heat or acid the viscose is readily decomposed with recovery of the cellulose in whatever shape was impressed upon the soluble and plastic compound. Comparatively few of the great variety of applications at first undertaken have been commercially successful, but we owe to viscose two industries of spectacular magnitude: namely, the manufacture of viscose artificial silk or rayon and that of the tough, transparent sheets of cellulose hydrate now so familiar under the trade-mark name of Cellophane.

The viscose rayon is made by squirting the viscose solution through minutely fine orifices into setting, decomposing, and washing baths, while Cellophane is similarly produced when a slit is substituted for the holes.

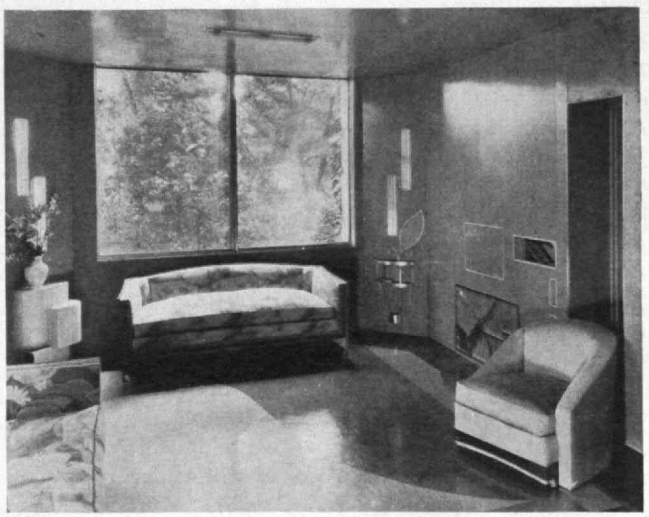
Since the discovery of viscose many other cellulose compounds which may ultimately become available as plastics have been produced. These include cellulose acetate and the whole range of fatty acid esters up to cellulose stearate, cellulose ethers, and cellulose benzoate. All are transparent products closely resembling those of nitrocellulose in their physical properties, but slow-burning and non-explosive.

The only one which has thus far found extended application is cellulose acetate, made by treating cellulose with a mixture of acetic acid and acetic anhydride in the presence of a catalyst, as sulphuric acid. The acetate so produced is soluble in chloroform, but the modified or ripened form commonly employed is soluble in acetone. Its important applications are in the manufacture of acetate silk, sold under the trade name of Celanese, the production of the base for the non-inflammable photographic and motion-picture film and of much thinner films as a wrapping comparable to Cellophane, and, very recently, the use of the granulated acetate as a molding powder.

Cellulose benzoate, made by subjecting cellulose to the action of caustic soda and benzyl chloride, is now produced on a commercial scale. It is a thermoplastic, but like the other cellulose esters, is not set or fixed by heat, as many of the synthetic resins are. It has such high resistance to water, alkali, and acids that it would seem to have a considerable field of usefulness.

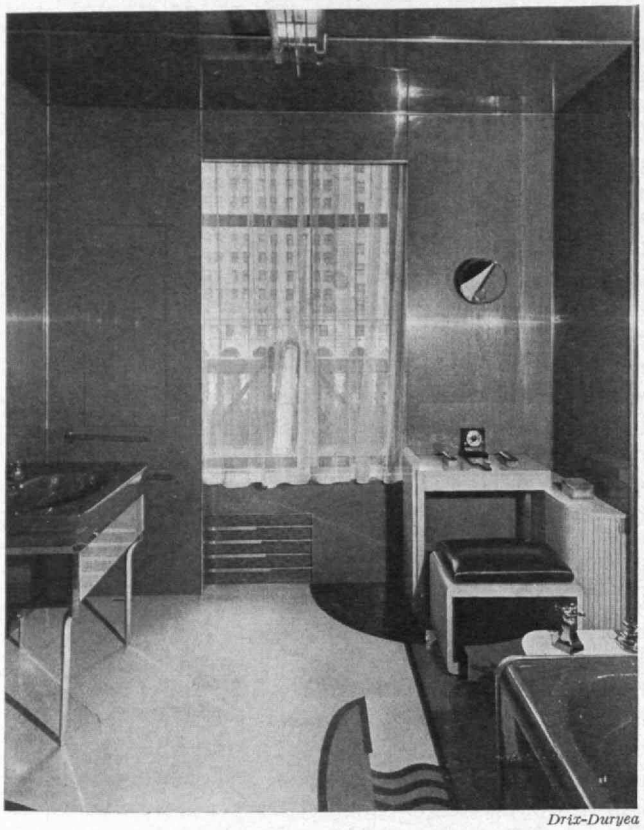
About 1905 the invention by Dr. Leo H. Baekeland of the methods of producing the synthetic resin, Bakelite, gave an extraordinary impetus to the plastics industry and turned its development into wholly new channels. Organic chemists generally in their search for new compounds have so definite a predilection for products, which, if liquid, have a definite boiling point or a crystalline structure, if solid, that when the reaction leaves them only with a messy, tarry product they feel little inclination to pursue it further. Long prior to Baekeland, it had been observed by Baeyer and several of his successors that the reaction of formaldehyde upon phenol resulted in the formation of condensation products, which, however, proved to be either uninteresting, tar-like bodies or otherwise so intractable that they failed to meet the requirements of industry. Baekeland reviewed all this work in an extended investigation which must be regarded as one of the classic triumphs of synthetic chemistry. As finally carried out under the carefully controlled conditions established by Baekeland, the reaction between phenol and formaldehyde in the presence of a suitable condensing agent goes forward in three stages. The initial product is soluble in alcohol, but may then pass into a second stage in which, while still fusible, it is no longer soluble, becoming ultimately under the influence of heat both insoluble and infusible. This final product in its pure state is a light yellow brown in color and almost perfectly reproduces amber in feel and color. To complete the resemblance Dr. Baekeland amused himself and mystified his friends by embedding mosquitoes and other small insects in the liquid before its solidification. In practice wood flour, pigments, asbestos, and other desired materials may be similarly incorporated in the final resin. Bakelite may be readily cast, molded, sheeted, or extruded, and when in solution finds employment as a lacquer. Bakelite has found so many applications in the electrical and other industries and appears in such variety of articles of use and ornament that it has been termed "the material of a thousand uses."

The significant commercial success of Bakelite greatly



Dritz-Duryea

A room designed by Hammond Kroll. Background of gray formica with door frame, radiator grill, and niches of satin chrome molding. Floor of gray and vermilion linoleum



Drix-Duryea

Bathroom designed by Hammond Kroll. The walls are of gray formica with aluminum moldings, the floor of inlaid rubber

stimulated research directed toward the production of other synthetic resins, and to such good effect that the British Plastics Year Book for 1933 has devoted 80 pages to the proprietary and general names of such resins, while the primary materials used in their manufacture cover 30 pages, and the products made from the resins themselves another 55 pages. With the number of these resins so great and constantly increasing, it is obviously impossible in this brief review to do more than refer to a few of the more typical of them and quite impossible to attempt to specify the names under which they are marketed.

The members of one group of these resins are prepared by combining a polyhydric alcohol, like glycerine, with the anhydride of a polybasic acid, the preferred example being phthalic anhydride. These resins are clear and colorless and lend themselves readily to the colored and opaque effects produced by dyes or other additions. They are commonly known as Glyptal.

The protean character of synthetic resins has recently been illustrated in the construction, in New York, of a three-room apartment in which furniture, fixtures, and bath tub — in fact everything except the plumbing — are made of the new resin, Vinylite. The Vinylite resins are the polymerized esters of the vinyl radical which occurs in ethylene. They are thermoplastic, clear or translucent, may be dyed or pigmented, and easily carry a high proportion of wood flour or other fillers.

Another important group of resins is produced in great quantity by the polymerization of coumarone, indene, and styrol.

Unusual scientific interest is attached to the resins produced by the action of formaldehyde upon both urea and thiourea. The urea resin is known as Pollopas and that from thiourea as Beetle. In their final form and without other admixture, they are glass clear and take colors so brilliantly as to have an almost gem-like appearance. The Beetle resin has found a considerable application in the production of articles of tableware, for which its appearance, light weight, and high resistance to breakage especially commend it. The raw material, urea, is produced synthetically in quantity from calcium carbide.

One of the latest additions to the family of plastics is Plioform, which, instead of being a synthetic resin, is an addition product of rubber. It may be obtained in deep or pale colors with or without transparency. It has a high resistance to impact; it is very resilient, while by being thermoplastic it may be molded readily since no curing is required in the press. Like many other of the modern plastics, it has high electrical resistance.

The molding of modern plastics has become a highly specialized art, and the mold maker himself has become a skilled craftsman of the highest grade. Whereas it is the general practice to fill the mold with molding powder, a system of so-called "injection" molding has recently been introduced, and its use is rapidly extending. By this latest method the plastic enters the mold as a liquid, filling every cavity, and metallic or other inserts are not displaced or bent by the pressure of a powder. The absence of pressure further permits the use of the cheaper soft metal molds for which no hardening is required. Plastics lend themselves primarily to mass production, in which identical articles can be produced with great rapidity. Although the molds themselves may be very expensive, their original cost is subdivided among the great number of unit articles produced from them.

Although the annual products of the industry already exceed $200,000,000 in value, those associated with the industry have the definite conviction that it is still in the initial stages of the great development which they foresee.

Even at this stage the demands of the industry for raw materials have reacted greatly to the benefit of certain of the more fundamental chemical industries. In 1922, for example, only 1,200,000 pounds of phenol were produced in the United States, whereas the figure in 1929 was over 24,000,000, of which 73% was used in the manufacture of phenolic resins, which thus now provide the broad foundation of the present phenol industry. In other resins of related character cresylic acid is used. This comes in duty-free from England, and in 1929 the volume of importations had reached 18,000,000 pounds.

Formaldehyde is the common constituent of many of the synthetic resins and is usually employed in the form of the 40% solution, of which about 52,000,000 pounds were produced in this country in 1929. In certain resins the solid hexa, made by the reaction of ammonia upon formaldehyde is used, and as the result, in two recent years the production of hexa increased from 1,300,000 pounds to 2,400,000 pounds.

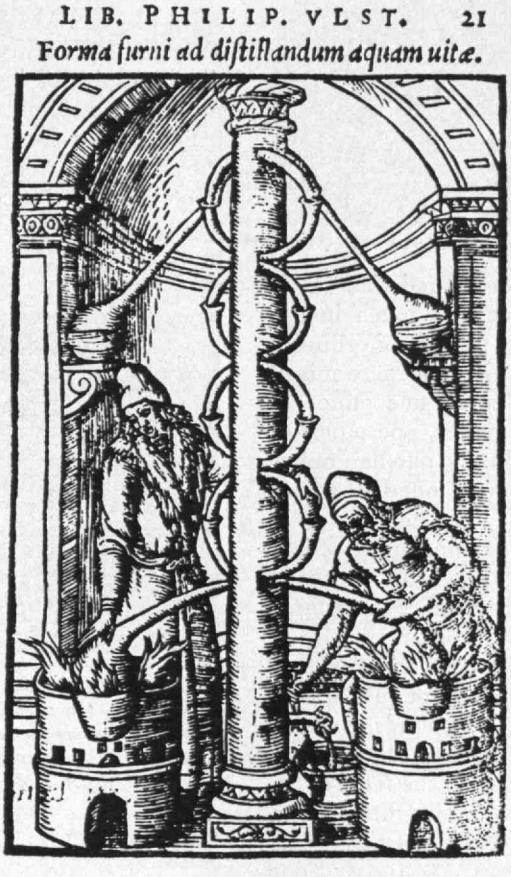
When one considers the great number of synthetic resins now available, an idea of the growing importance of the industries based on them (*Concluded on page 239*)

THE TREND OF AFFAIRS

For Thy Stomach's Sake

WE WRITE now of old arts and ancient practices, of matters for 12 years unmentioned in public print but now, since the 5th of December, 1933, again of good repute and, if we judge the signs correctly, of restrained and intelligent interest. The art of drinking is old; perhaps its invention marks the point at which man began to be civilized. But the art of preparing the wherewithal for the purpose is much older yet; it was practiced before there was history.

Sealed glass vials containing wine have been found in Egyptian tombs. A sample of the ancient wine was analyzed by Berthelot, who found that it contained considerable acetic acid. It was inferior to the wines which are made today, for we know more of the causes of the souring and we know how to prevent it by excluding air and by pasteurization. The Romans prevented the souring of their wine, or retarded it, by the use of pitch. It was their practice to throw pine pitch or pine boughs into the wine vats when the first fermentation was about completed. The alcohol in the wine dissolved a portion of the material of the pitch. The wine possessed a strong flavor, but it kept better than wine made without the pine and was in other respects superior — and the Roman connoisseurs learned to like the turpentine-like taste and came to regard it as an indication of excellence. The people of northern Europe, who made their wine from grain, used hops which contains much resin and pitch-like matter for the same purpose, and their wine was what we now call beer.



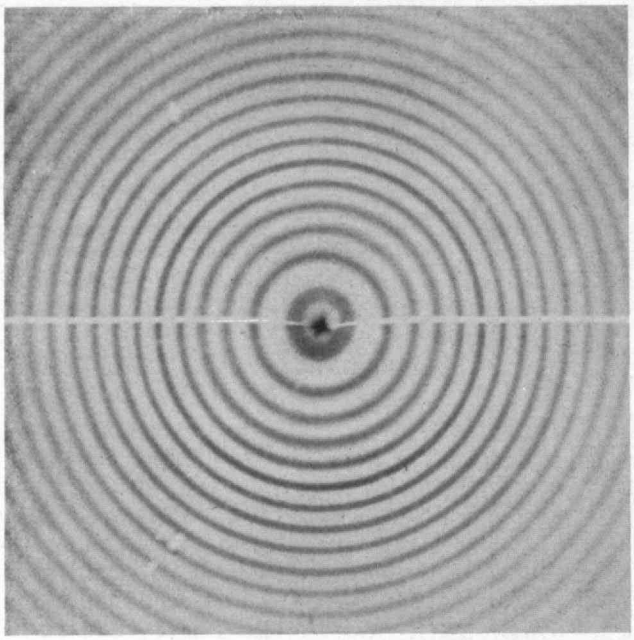
Distilling in the Sixteenth Century — from a book by one Philip Ulstadtius, published in 1572 and entitled "Coelum Philosophorum (*Heaven of the Philosophers*) Sev Liber De Secretis Naturae"

Epicures of all ages have devised various ways of altering the natural properties and powers of wine, either by adding something else to it or by getting the active principle, the "spirit of wine," the alcohol, out of it.

The Romans made a heavy, sweet, syrupy wine by boiling the fresh juice of white grapes until it was reduced to a third of its original volume and then allowing it to ferment. They made special aromatic wines by allowing ordinary wine to stand in contact with flavored substances and finally drawing it off after the flavoring matter had been extracted. For this purpose they used thyme, mint, saffron, wormwood, and gentian root, precisely the same materials as are used in the modern manufacture of cordials. They also used juniper berries for flavoring their wine. Old-time Holland Genever is made by distilling juniper berries with rectified spirits, but many of the gins which are on the market contain other substances as well.

The Emperor Nero, best known for his scandalous conduct on the evening that Rome was burned, is distinguished for two other reasons. One is the monocle, made of an emerald, which he wore while looking on at the gladiatorial combats; the other is his invention of a device for cooling wine. It was a slightly flattened glass bottle with a pocket in its side. The wine to be cooled was put in the bottle, a quantity of saltpeter was put in the pocket and water was poured upon it. The dissolving of the saltpeter in the water absorbed heat; that is, produced cold. The solution could then be thrown out, more saltpeter and more water introduced into the pocket, and the wine cooled to any desired degree. It could even be frozen. But when wine freezes, it is the water which it contains which freezes, and the unfrozen portion is richer in alcohol than the wine was before. That also was an advantage from Nero's point of view. The farmer with a comparable technique leaves his cider barrel outdoors during the winter and procures applejack.

Some of the drinks which were popular during the Middle Ages are very interesting. Readers of Rabelais will remember the delight of Panurge in his hypocras. Here is the recipe for it. "Take four pounds of white wine, four ounces of hard white sugar, one ounce of cinnamon laurel, three drams of coriander, two drams of clove, one-half dram of saffron, two scruples of long pepper, one-and-one-half drams of ginger, and a few crabapple seeds. Macerate the ingredients together, let stand, and filter through a linen cloth." At the time of the celebration of the marriage of Charles VI to Isabeau de Bavière, the fountains of Paris are said to have flowed with hypocras instead of water and, what is perhaps equally marvelous, the liquid is said to have been a source of especial delight to the people.

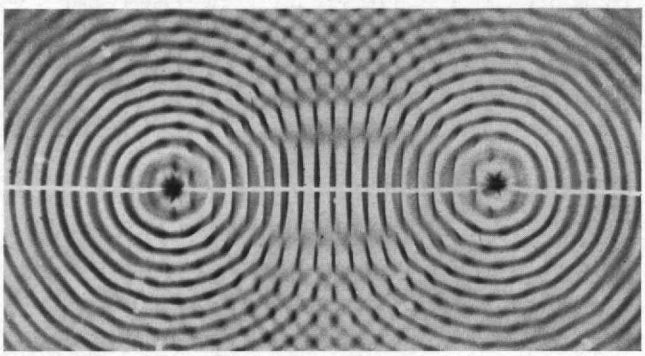


The name of the German Emperor Frederick III is attached to a stronger drink which was much in use during the later Middle Ages. Four pounds of ordinary brandy and four pounds of Malvoisie wine were mixed with three ounces of cinnamon laurel, one ounce of clove, one-and-one-half ounces of ginger, one ounce of nutmeg, one-half ounce of nutmeg husks, one-half ounce of saffron, two drams of galanga root, one-half ounce of cubeb, one-half ounce of salvia, one-half ounce of lavender flowers, one ounce of melissa, one ounce of iris, one ounce of balsamine, and one and one-half ounces of white rose petals. The ingredients were placed in a large glass globe and there were added 15 or 16 pounds of white sugar, three ounces of raisins, six ounces of figs, one-half ounce of camphor, two pounds of rose water, two pounds of chicory water, and two pounds of water of elder blossoms. The globe was closed tightly and exposed to the sun for 20 days, ten before the feast of St. John and ten after. The liquid was finally filtered and distilled. It is an historical fact that this is the beverage with which the knights of the time used to fortify their stomachs before entering the combat of the tournament. They were hardy men — and hardy stomachs.

The present perfection of the art of making wine is largely due to the work of Pasteur who showed the effect of stray organisms in producing souring and in modifying the flavor. Different yeasts yield wines of different flavors from the same grape juice, and pure cultures are now generally used for the best wines.

Grape juice contains considerable tartaric and some malic acid. During the fermentation, when the alcohol content increases, the tartaric acid commences to precipitate out in the form of its hydrogen potassium salt. The precipitate is "argols" or crude cream of tartar. Precipitation continues slowly for a year or so longer after the fermentation is complete. The aging of wine involves the removal of much of the tartaric acid, in part by precipitation and in part by interaction with the alcohol, as the other acids which are present also interact, for the formation of esters which give the wine its characteristic odor or "bouquet." The aging is said sometimes to be hastened nowadays by the addition of calcium hydrogen malate which precipitates the tartaric acid and leaves malic acid in the liquid.

The ancients were acquainted with the art of distillation, but applied it to the manufacture of essential oils, perfumes, and so on. Distilled spirits did not appear in Europe until the Middle Ages and were first used for medicinal purposes. Until about 1700 alcohol was known only by the name of "spirit of wine" or "spirit of grain." Al-kohl was the powdered stibnite with which Arab ladies blackened their eyelids. Francis Bacon tells that the women of the West used alcohol for this purpose, and alcohol in his day was not the same thing as spirit of wine. Absolute alcohol was first prepared in the Thirteenth Century by Raymund Lull who repeatedly distilled spirit of wine with quicklime. He observed that meat did not putrefy when kept in the spirit, and believed that he had prepared the elixir which all of the alchemists were seeking. He doubtless tried its effect upon himself, for he said of it, "If this Quintessence will preserve a dead body from putrefaction, how much more then ought it to do to a living one?"



Shadow photographs (made by C. A. Dyer) of wave motion formed on the surface of water. On this page are shown the patterns formed by one (upper left) and two (above) vibrating sources; on the opposite page, interference patterns formed by three sources. Note the interesting designs of the latter three

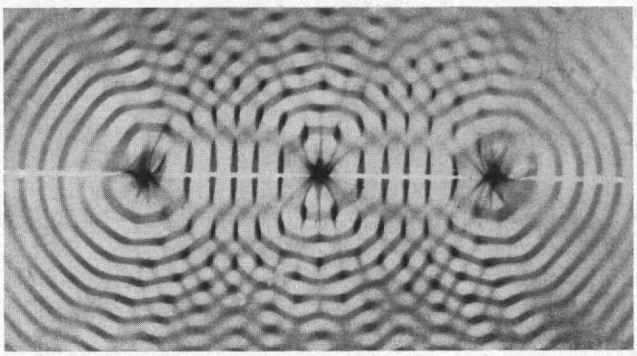
The Pre-Fabricated House Marches On

DESPITE the meager showing at the Century of Progress (The Review, October, 1933), recent observation yields the conclusion that the manufacture and sale of the pre-fabricated house is passing from the realm of fancy to that of fact. Transition to the industrial period may be noticed even in the current descriptions of the offered houses. There is increasing tendency to stress equipment, accessories, gadgets; one recent proposal intends to supply all furniture and even dishes under the flat price. Pre-fabricated houses have even been sold and are in actual operation. But there is still a welter of elaborate claims, vague and untried ideas, and prices based upon an imaginary mass-production.

New materials are being subjected to closer scrutiny. The Pierce Foundation, after years of jealously guarded silence, emerges with a house which is to use vinylite (see page 222), the relatively new and promising thermoplastic synthetic resin. The Forest Products Laboratory in Madison, Wis., has discovered that

ply-wood, glued top and bottom of floor joists, permits the use of six-inch joists where ten-inch ones would otherwise be required. This is in accordance with the airplane construction principle of the stressed covering and is probably of considerable significance. The influence of the airplane appears again in the canvas houses of Stanley W. Nicholson (Wisconsin), himself an aviator, who stretches canvas across a light wood frame and then waterproofs and shrinks it into place by the use of a cellulose composition. Canvas is coming in for further attention by the United States Department of Agriculture, which at its Beltsville Experimental Farm in Maryland is trying this material as an exterior house finish, testing adhesives and protective paints in connection with it and in general developing data that may prove to be important.

Apart from the new materials, the basic principles of construction on which the newcomers rely do not seriously depart from those previously advocated or shown at Chicago. The most surprising development appears to be the renaissance of suspended construction at a



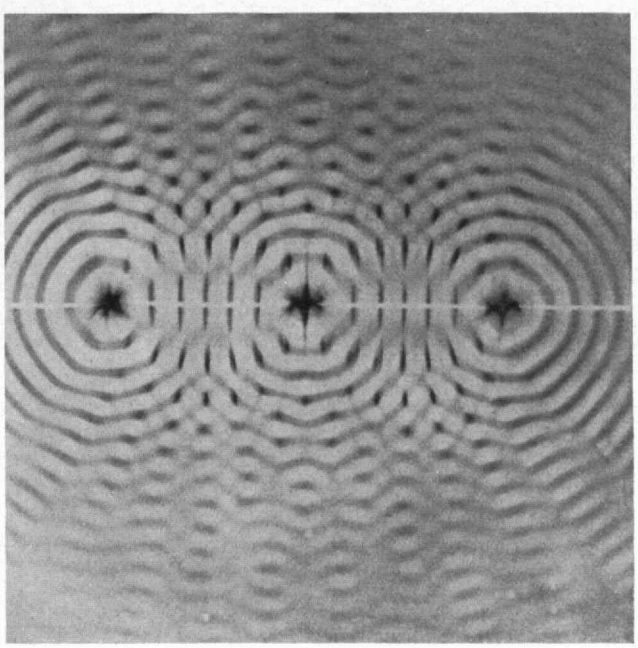
These water ripples were photographed in a stroboscopic ripple tank and produced by small projections soldered to a wire (the white horizontal line) stretched between the poles of a permanent magnet and vibrated by a 60-cycle current. *See page 218 for other pictures illustrating wave motion*

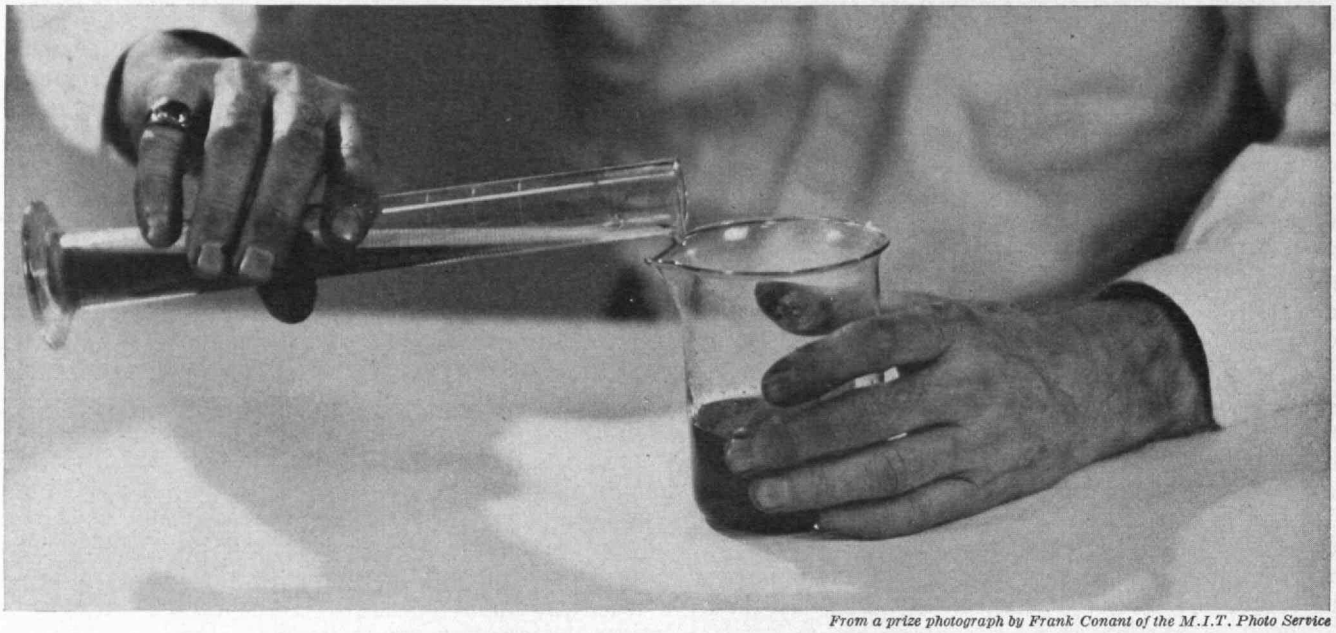
time when its originator, Buckminster Fuller, has come around to admit that his Dymaxion House was perhaps "merely an attitude of willingness to think truthfully" and when its first disciples, the Bowman brothers, have lapsed into silence. The new proponent of suspended construction is no less a personage than the distinguished modern architect, Richard Neutra of California. He is seconded by a less clear scheme emanating from Walter Baermann of Holyoke, Mass. Neutra calls his house Diatom, because the intermediate filler panels are a composition with diatomaceous earth as the aggregate. The Diatom house is to have columns in its center, projecting above the roof. At the roof level beams are to extend from the columns transverse of the house and the exterior wall reaction of these beams is picked up by a diagonal tension member stretching from the top of the posts. The building suggests the breathing dome of the Transport Building in Chicago and most eyes will find it even uglier. Neutra specifies radiant heat from ceiling panels and light from vacuum tubes, thus going the whole way. His house as well as Baermann's seems to involve difficulties in handling balanced loads.

Nor is that old chestnut, pre-cast concrete, peacefully laid in its grave. Atterbury's proposals are renewed in modified form by Alfred Kastners for his Government Negro Housing in Richmond, Va. Barry Byrne suggests pre-cast channel sections so like those of the old Telford system as to need no discussion. Despite a long history of distinguished failure, precast concrete, it seems, will, like monarchy in France, always have its claque.

The more extensive developments, however, have occurred with frameless and wall-panel types. The frameless idea of the Ferro-Enamel type seems to be gaining ground and is now sponsored definitely by good-sized corporations of Zanesville and Cleveland, Ohio, and Wheeling, West Va. A roughly similar idea appears in a suggestion of the architect, H. T. Lindeberg. Broadly speaking, all these houses have walls of what is essentially a form of steel sheet-piling, with floor of welded Z-plates of steel. They all require considerable finishing after the steel is erected; moreover, the erection does not appear to be as easy as it might be, due to the inability thus far to produce parts with accurate tolerances. None-the-less, they must appeal to a number of hard-headed industrialists with steel to sell, if we may judge by the increasing number of firms who offer them.

Framed houses with pre-built wall panels are offered by American Houses and the Buell Fabricated House System. They have also been suggested by A. Lawrence Kocher, '13, and Albert Frey. These houses all provide a base wall panel of insulating material, partially pre-finished, of wall height and considerable width. They connect these panels by means of metal parts which seal joints and also form the frame. Kocher and Robert McLaughlin, the designer of the American Houses building, use a two-part stud supporting the expanded bar joist floors; Buell has his stud on the outside only. All have paid some attention to the problem of eliminating excessive heat loss and condensation. Buell and Kocher cover their insulation with steel; McLaughlin distrusts steel outdoors and uses asbestos cement for his exterior finish.





From a prize photograph by Frank Conant of the M.I.T. Photo Service

So far the McLaughlin solution appears the most promising. The houses he has built are well planned and in the International Style. There is a good deal of common sense in the entire approach. Moreover, their sponsor seems to have lost little or no money in the effort. That is important. It means that the baby is going to grow up. The fact is that the pre-fabricated house industry shows every sign of emerging from the incubator into at least the swaddling clothes stage.[1]

Detonation Meter

RESEARCH on combustion and detonation in internal combustion engines in the M. I. T.'s automotive engineering laboratory has resulted in the development, not only of the photographic technique described on page 218, but of a new device which has been termed a detonation meter. This capable instrument consists essentially of a small diaphragm exposed to cylinder pressure. Motion of the diaphragm is imparted to a coil of wire which moves axially in a radial magnetic field. The electromotive force, generated by the coil motion, may be amplified and analyzed by means of an oscillograph, or the energy output may be integrated by means of a suitable instrument. The detonation meter was developed by Mr. C. S. Draper, '26, Professor E. S. Taylor, '24, and Mr. G. L. Williams in the course of studies of pressures and pressure fluctuations in cylinders.

Considerable work with the instrument has been done by Mr. Draper, who is carrying on detonation studies. The results show that the sound of detonation is caused by resonant vibration of the cylinder gases. As a detonation meter, the instrument gives readings over a range of intensity varying from completely inaudible detonation to an intensity considerably greater than that usually encountered in engine operation.

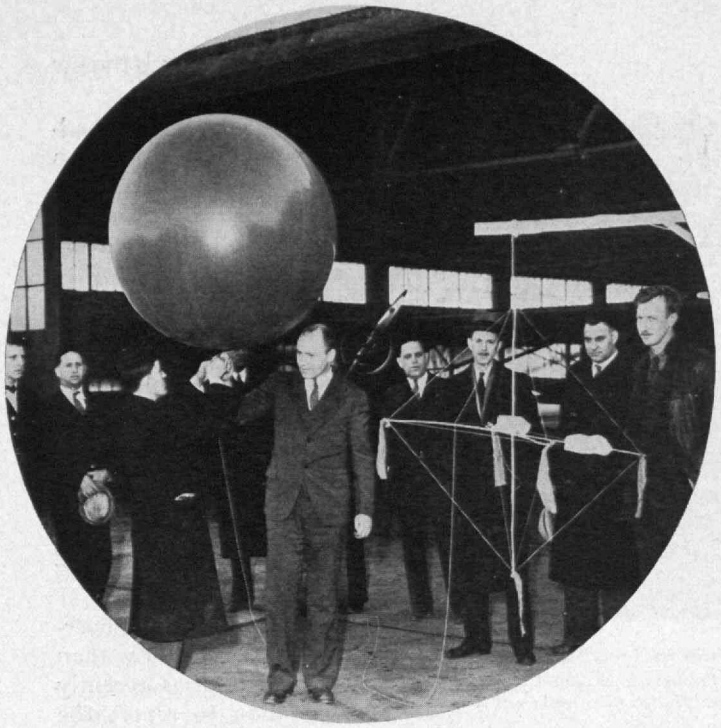
This development formed the subject of a paper presented at the annual meeting of the Society of Automotive Engineers in Detroit on January 23, 1934. The paper was read by Professor C. F. Taylor, '29, under whose direction the work has been carried forward.

[1] Readers wishing further details about the systems described above should consult the *Architectural Record* for January, 1934.

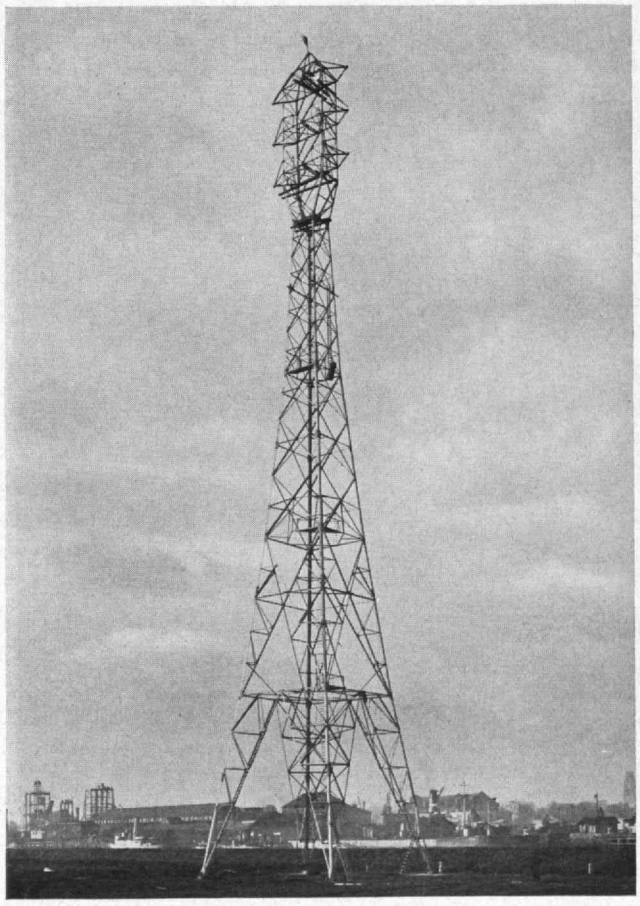
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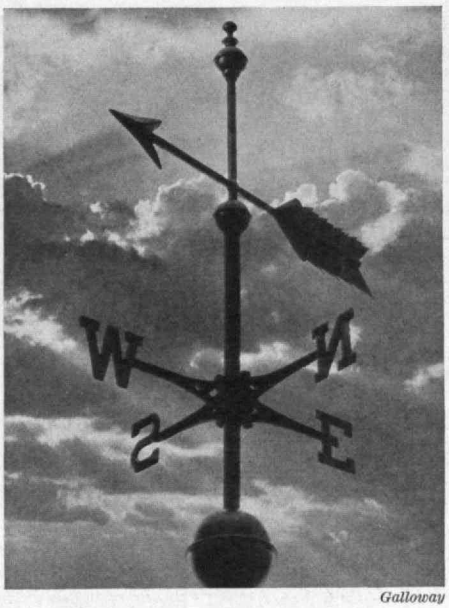
CUTTINGS from the editorial grab bag: Sea water pumped at the rate of 26,000 gallons a minute through a plant on the North Carolina coast is yielding half a million pounds of bromine a month.—Great Britain has built five times as much commercial ship tonnage as the United States in the last five years. Data gathered by Lloyd's Register of Shipping show a total of 3,028,872 tons for the United States and 15,212,702 tons for Great Britain and Ireland.—Inserts of pyrex glass are now soldered into can tops to permit inspection of contents.—Pyrex bobbins for winding and spinning viscose are now available.—Work is in full swing on the great Colorado Aqueduct, costing about $220,000,000, traversing 250 miles of desert, and bringing water to 13 thirsty Southern California cities. Pine Canyon Dam, to be a part of the Aqueduct's distribution system, is now nearing completion on the San Gabriel River near Azusa, Calif. Two hundred and forty feet high, it will augment the water supply of the City of Pasadena.

Seventy-nine per cent of Switzerland's railroad mileage is now electrified. Nearly 1,500 miles are operating electrically.—Transite, a mixture of asbestos and Portland cement and having great resistance to corrosion, is now available in the form of pipes ranging from two to 36 inches in diameter.—Dr. Dayton C. Miller of the Case School of Applied Science has announced a more accurate determination of the speed of sound. His figure: 1,087.13 feet a second.—Work on what Britishers call the world's longest bridge is progressing according to schedule on the lower Zambesi River. All except two of the main foundations have now been sunk to the full depth and the construction of half of the spans completed.—An English textile company has announced a new substitute for flax made by blending flax with other fibers. Fabrics made of it are said to possess a



Professor Carl G. Rossby, Technology Meteorologist (holding balloon), and his assistant, Chris Harmantas, ready to send aloft the first of 40 sounding balloons at the Lambert-St. Louis Flying Field. The balloons carried into the stratosphere instruments for recording temperature, pressure, and humidity at the various levels. The instruments are in the aluminum case in the center of the bamboo frame, which breaks their fall. *(See story on page 231.)* *The first balloon, with its meteorograph intact, was found three hours after its release 100 miles southeast of Lambert Field at Metropolis, Ill. Below: Electrical transmission tower with Lincolnshire, England, in the background. It forms a part of a 33,000-volt ring in England's electrical grid*





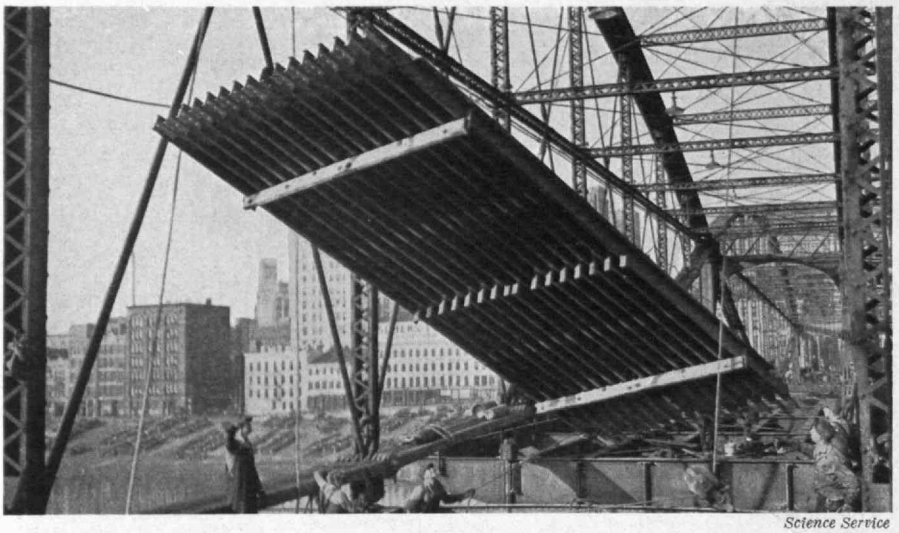
Galloway

remarkable power of absorption, to take dyes well, and to improve with laundering.—New asphalt-aluminum paints furnish films which have a bright, lustrous appearance and high protective value.

Glass "silk" or "wool" is now used as sound and heat insulation.—Eight full-sized newspaper pages may now be recorded on a strip of film measuring one and three-eighths inches by 12 inches. The film outlasts newsprint and offers a method of storing newspapers in small spaces.—Automobiles of the United States plus the plants which build them, the garages to house and service them, the highways to run them on, and the petroleum to lubricate and propel them exceed in value the $26,000,000,000 concentrated in the nation's steam railroad system.—The recently completed Schlachthof Bridge in Dresden, Germany, which is 1,040 feet long and crosses the Ostra tidal channel, a floodwater tributary of the Elbe River, in 13 plate-girder spans varying in length from 72½ to 86 feet, is the longest welded bridge in Europe and involves a greater tonnage of welding than any other bridge in the world.

Beams in the Darkness

PROGRESS continues in the application of the peculiarly penetrating characteristics of infrared light to problems of navigation. The infrared sextant, designed by P. H. MacNeil to take observations of the sun when that age-old reference point is entirely obscured by clouds or fog, has been followed by the infrared camera. Developed by Captain F. M. Williams, a former officer of the Navy, the new camera makes it possible to take photographs through fog or haze which reveal what lies in the path of a ship for a distance nearly five times greater than the eye can see. Photographs are available for inspection 30 seconds after the exposure is made, an interval so short that under ordinary conditions the navigator would have reasonable warning of danger ahead. Such a camera may be expected to have a particular value in the North Atlantic during the season when icebergs drift into the path of shipping.



Science Service

It was a distinct innovation when steel, in addition to wrought iron, was used more than 50 years ago in the design of Pittsburgh's Smithfield Street bridge by the bridge builder Lindenthal. Now the structure pioneers again in having its heavy steel and timber floor replaced by one made of aluminum and aluminum alloy. The old bridge seemed doomed until aluminum's lightening of its dead load increased the factor of safety so much that the structure will see many more years of service. The photograph shows an aluminum alloy floor panel being lowered into place

Eventually the visible beams of lighthouses may be supplemented by invisible infrared beacons to warn mariners when fog shrouds the coast, and possibly for warning signals between ships at sea.

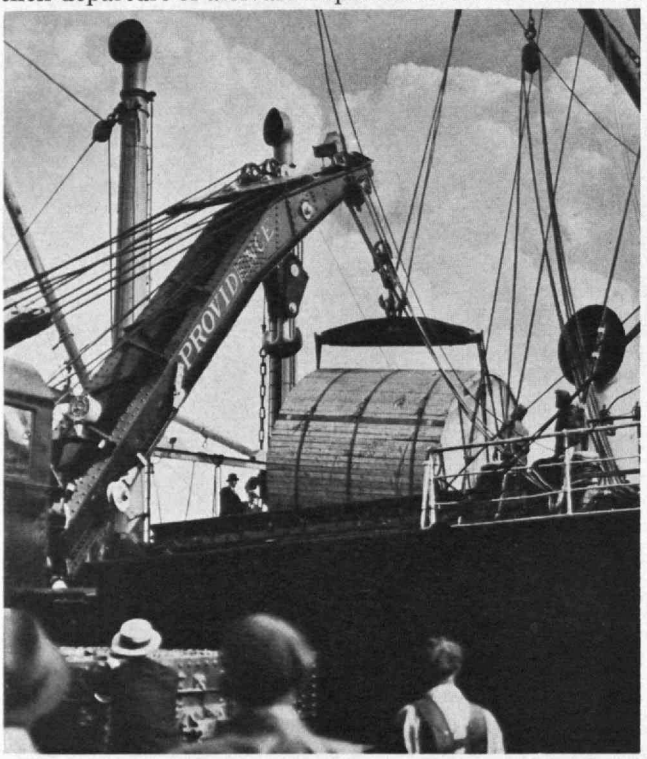
The navigator of a well-equipped ship now has at his command instruments which under normal conditions serve every purpose of navigation. He can determine the depth of the water under his vessel by listening to the echoes of sound waves sent to the floor of the ocean. Instruments sensitive to sudden changes in temperature warn of the proximity of ice fields, radio compass direction-finders play an important part in determining the location of ships, but fog still remains a problem for which science is constantly seeking a solution.

The Institute's staff at the Round Hill Research Station has for several years been engaged in a study of fogs, their origin, and the size of the particles of which they are composed. The fact that there are more than a score of fog types complicates such an investigation. Much progress has been made, however, and further advances in this work may lead to the solution of some of the problems of navigation.

There is no doubt that the urgent necessity for developing instruments for aeronautical navigation has had a stimulating effect on the general progress of the science of navigation. Blind flying and blind navigation on the sea present quite different problems. Whereas the navigator may slow down or stop in the face of uncertainty, the flyer must go on until he knows his location and the conditions for landing. Here the factor of time is of vital importance. In addition to radio communication between aircraft and the ground, which permits the transmission of weather information, electrical means have been developed for guiding aircraft to landing fields with amazing accuracy. The most recent is a system in which radio impulses aid the pilot in following an invisible path down through clouds and fog until his ship touches the ground. Developed by the United States Bureau of Standards, this system, in conjunction with other navigation aids, gives a pilot his altitude, the distance from the landing field, and his position to right or left of the runway to which the radio beams beckon him, with an accuracy that detects a deviation of 20 feet from the course at a distance of less than a mile. The aviator for some time has had instruments which made level and directional blind flying possible, but the problem of landing in a fog or darkness has been one of the great obstacles to maintaining scheduled flights.

In England, a radio system operating on a wave length of less than one-sixth of a meter was recently put into operation to report the passage of aircraft in flights between France and England. From an antenna less than an inch long, this beam radio system, which is said to be free from interference from static and other electrical waves, provides a reliable communication system for voice or machine transmission.

The system operates between a station at Lympne, England, and St. Inglevert, near Calais, and is now employed in reporting the flights of airplanes operating without the aid of radio facilities. The planes are required to indicate their passage by circling over the stations. Their identification numbers are noted and their departure or arrival is reported to the other station.



Morton Bartlett

Lifting a 30-ton paper drier from a steamer hold at the Boston Army Base

THE INSTITUTE GAZETTE

PREPARED IN COLLABORATION WITH THE TECHNOLOGY NEWS SERVICE

From the Stratosphere to the Ocean Depths

ONE cold, still day late last month, Institute meteorologists at Lambert Field Airport in St. Louis watched with interest as a small red rubber balloon shot away from the earth, bound for the stratosphere. Two hours later it was followed by another, until 40 of the hydrogen-filled bags, carrying delicate recording instruments in shock-absorbing bamboo frames, had been released in Technology's latest study of stratospheric weather.

Overhead as the balloons floated off, flew the Institute's meteorological research airplane, piloted by Lieut. Henry B. Harris, in search of supplementary weather observations at high altitudes.

Directing the experiment at St. Louis was Professor Carl G. Rossby, Head of the Division of Meteorology at the Institute. The balloons, each about four feet in diameter when inflated, were released in accordance with careful weather forecasts prepared at Technology by Professor Hurd C. Willett and Dr. Jacob Bjerknes, the distinguished Norwegian meteorologist of "polar front" authority. Dangling from each balloon at the end of a long elastic band was a specially designed meteorograph, weighing but a few ounces, which automatically recorded altitude, humidity, temperature, and atmospheric pressure.

These travelers to the stratosphere rose many miles above the earth, and finally burst in the rarefied air of that region. The fluttering fragments of broken rubber were relied on to break the instruments' speed of descent. Each bore an identification tag offering a reward to the finder, providing the instruments and their records were not tampered with. Further instructions advised finders how to care for the instruments.

A mid-continent location for the experiments was chosen in the hope that most of the instruments would be found on land. To carry out the study in New England, where the prevailing winds are from the west, probably would have resulted in loss of most of the balloons at sea.

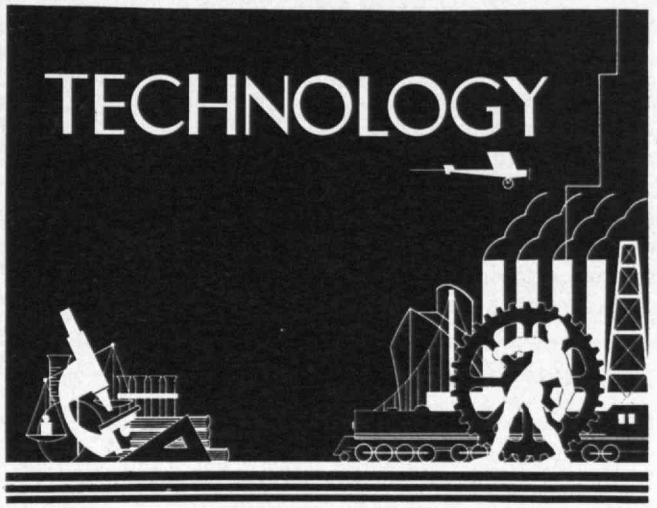
Extension of the Institute's high altitude meteorological exploration has been made possible by a grant from the Rockefeller Foundation, which has also made a grant to Professor Rossby and Dr. Bjerknes for special research, of which these experiments formed a part. The information gathered in these upper air observations is expected to result in important contributions to the science of weather forecasting.

NOT content with fathoming the heavens, Technology's meteorologists also plan to plumb the ocean in search of new knowledge to aid them in their studies.

This paradoxical quest is based on the striking similarity which has been found to exist between the behavior of ocean currents and currents of air in the atmosphere. From studies of turbulence problems in the sea, which are expected to be comparatively easy to make, the investigators hope to secure data which can be applied to atmospheric conditions.

It has been definitely established that the friction of the wind blowing over the sea creates surface water currents whose direction and velocity vary with the depth. These surface currents are superposed on the tides and great currents, such as the Labrador and Gulf Streams, and may extend to a depth of from 30 to 500 feet. Because of the thorough vertical stirring received by the water in this layer, its temperature is fairly uniform, hence its name of "homogeneous layer."

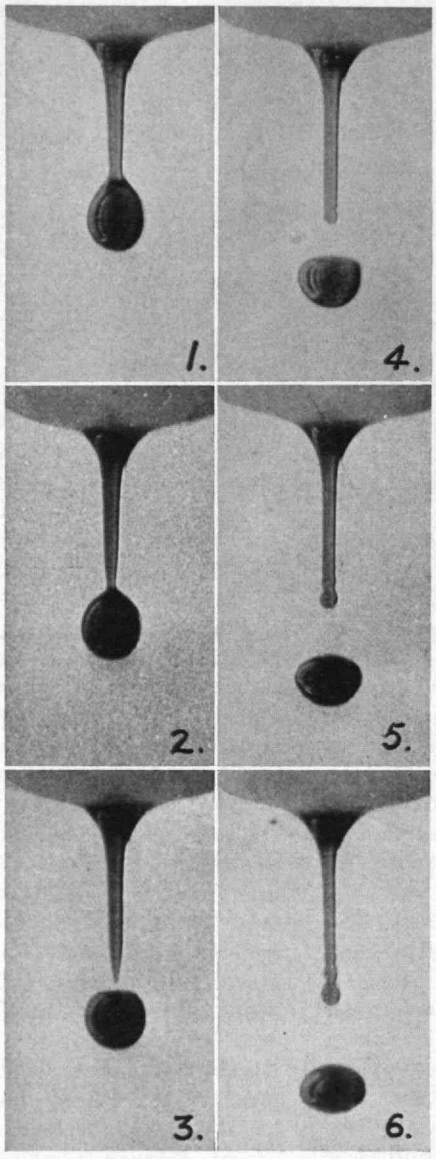
This homogeneous layer in the ocean is in many ways comparable to the troposphere of the air. Most of the important weather phenomena probably do not take place in the stratosphere, but below in the turbulent troposphere. Similarly, the swirling homogeneous currents may be looked upon as the birthplace of the ocean's "weather." Not only is this layer important for the solution of atmospheric and nautical problems, but as the principal seat of organic life in the sea, it holds many secrets of plant and animal growth. Since it may grow thicker or thinner through converging or diverging motion, it may control movements of underlying strata. Scientists must know the homogeneous layer in detail in order to estimate the significance of that part of the oceanic circulation which is wind-driven. Professor Rossby, who also heads the Meteorological Department of the Woods Hole Oceanographic Institution, has estimated correlations between wind and water



Title design for the Institute cinema, "Technology." This cinema received its first public showing at the mid-winter dinner of the Faculty Club on February 15 and its first alumni showing at the Alumni Dinner on February 17. A more extended account of the preparation of this film will appear in a forthcoming issue of The Review. Titles were designed under the direction of the Department of Architecture

speeds and the depth of the homogeneous layer. Up to the present, however, no means have existed for checking these figures experimentally.

Dr. Karl O. Lange, who is in charge of aerological work and meteorological instruments at Technology and is also associated with the development of oceanographic devices at Woods Hole, recently devised in coöperation with several other scientists an instrument which continuously records water temperature as a function of depth. The new oceanograph is accurate to within one-tenth of a degree Fahrenheit in temperature and one foot in depth, in a total depth of 600 feet. It records its findings as a tracing on a blacked aluminum foil. It is now in use aboard the *Atlantis*, research vessel of the W.H.O.I., in a series of tests which in time may make possible greater accuracy in weather forecasting.



High-speed photographic proof that a falling drop of water does not elongate into the rain-drop shape commonly supposed, but maintains instead a spherical form. The pictures show a drop of inky water falling from a wet electric light bulb and were made at the rate of 500 per second with the high-speed technique developed in the Institute's laboratories

Sigma Xi Chapter

A LOCAL chapter of Sigma Xi, national honorary scientific fraternity, has been authorized for Technology by the national society, and plans are now under way for its early establishment. Both faculty members and outstanding students will be eligible for membership. A number of Institute officials already belong to the fraternity, having joined chapters at other institutions, and it was upon their petition that the national organization authorized the installation of a Technology chapter.

Ad Quos Honores Sunt

THE appointment of Henry A. Morss, '93, to the office of Acting Treasurer was announced at the Institute on February 1. Mr. Morss has been active in Technology affairs since his graduation. He has been a Life Member of the Corporation since 1924, and as Assistant Treasurer for many years shared with his brother, the late Everett Morss, '85, the chief financial responsibilities of the Institute.

Dr. Vannevar Bush, '16, Vice-President and Dean of Engineering, was appointed Assistant Treasurer.

Named to temporary membership on the Executive Committee of the Corporation was Henry E. Worcester, '97, Vice-President of the United Fruit Company and long a member of the Council of the Technology Alumni Association. He will take the place of Gerard Swope, '95, President of the General Electric Company, whose duties in the National Recovery Administration prevent his attendance at meetings for the present.

The promotion of Dr. Robert J. Van de Graaff from Research Associate to the rank of Associate Professor in the Department of Physics also was announced. This advancement came in recognition of his notable work in electrostatics, of which the development of the great electrostatic generator at the Institute's research station at Round Hill, Mass., is one striking example.

From Nippon and the Argentine

PRINCE IYESATU TOKUGAWA, former President of the Japanese House of Peers and delegate to the Washington Arms Conference, and his son, Prince Iyemasa Tokugawa, minister from Japan to Canada, were guests of the Institute on January 16. They were met by a group of Technology officials, including Vice-President Bush, Dr. Jerome C. Hunsaker, '12, Professor James R. Jack, Professor Dugald C. Jackson, and Dean Samuel C. Prescott, '94, who conducted them through the buildings. The visitors evinced special interest in the nautical museum and the mechanical engineering laboratories.

On January 9, a group of 17 business and professional leaders representing the *Instituto Cultural Argentino-Norte Americano* of Buenos Aires, inspected Technology as part of a tour of American educational institutions. The party was led by Dr. Cesar Diaz Cisneros, a prominent lawyer of Argentina. They were shown a number of interesting projects exemplifying the application of technical education to science and industry.

Measuring Safety in Split Seconds

AN ELECTRICAL instrument which measures the speed of thought and muscular response of an automobile driver when he is called upon to stop his car in an emergency has been developed by Charles W. Frank, '27, and a group of engineers working under the direction of Professor Carlton E. Tucker, '18, of the Electrical Engineering Department.

The new device, known as the delay timer, is believed to be the first of its kind. It was especially designed for use in the Massachusetts Highway Accident Survey,



Latest airplane view of Technology's main group of buildings in Cambridge. The Charles River Basin is frozen over in the picture

now in progress under the Institute's direction, to determine the reaction time of the average automobile driver to normal and emerg ency traffic situations.

Two cars are employed in testing a driver. The leading car contains apparatus for registering the responses of a driver in a following car. Stopping or slowing of the leading car is indicated by the lighting of the stoplight as in normal operation. The instant the brake in the leading car is applied, an electrically charged measuring condenser begins discharging its store of electricity.

When the driver under test sees the stoplight on the car ahead he applies his brakes. The instant his foot touches the brake pedal an electrical impulse is sent out from apparatus in his car. This impulse is picked up in the leading car and instantly stops the discharge of electricity from the measuring condenser. The amount of electricity left in the condenser is automatically registered on a meter and this reading is readily converted into the corresponding time interval. The total reaction time of the driver, therefore, is the measurement of the time elapsing from the application of brakes on the first car until the driver in the second applies his brakes. In addition to the driver, the leading car carries an engineer who reads and resets the apparatus after every stop, and another who records the corresponding reaction time, road and traffic conditions, and the speed of the cars.

The stoplight signals from the research car are symbols of emergency conditions frequently encountered by the average driver in city traffic and on the highways. The question to which engineers are seeking an accurate answer is: How fast does the average driver think and act in the face of an emergency, such as when a child darts from the sidewalk into the path of his car, when a car speeds from a blind street, or when the driver ahead makes a quick stop?

This study is expected to give engineers accurate data on what may be expected of the average driver, how quickly he perceives danger, and how fast his muscles react to what he sees.

Numerous other researches undertaken by the survey engineers, under the direction of Professor Robert C. Eddy of the Department of Business and Engineering Administration, are disclosing valuable facts on accident hazards, traffic safeguards, and the driving practices of motorists.

Thousands of automobile drivers throughout the Commonwealth recently were given an opportunity to answer a questionnaire requesting their opinions and suggestions for increasing highway safety. Some of the interesting questions put to these representative drivers were: What are the best methods of traffic control? Are "stop before entering" signs, blinkers, and automatic traffic lights on highways properly located? What highway locations are considered by motorists as danger spots? Should the schools be required to teach children accident prevention? What penalties would help to cure drivers of careless habits?

In a study of highway visibility under ideal weather conditions, it was discovered that the risk of injury to pedestrians walking on highways at night is measured in split seconds. It was found that a pedestrian cannot be seen by a driver of a car with legal headlights until he is within a distance of 88 feet. When another car with legally adjusted headlights approaches, this distance is reduced to 60 feet. This means that a driver sees a pedestrian only six seconds before he reaches him when traveling at 10 miles an hour; three seconds at 20 miles; and one and a half seconds at 40 miles per hour, a speed quite common on many highways. A car with four-wheel brakes traveling at 30 miles an hour requires an average of 115 feet to stop.

Still another study of the use of hand signals by motorists and the position of vehicles in traffic lanes is expected to make possible recommendations for improved traffic control systems in many communities.

Presidential Cruise

PRESIDENT and Mrs. Compton sailed from New York on the *Kungsholm* on January 26 for a winter vacation of several weeks in the West Indies.

Earlier in the month, Dr. Compton addressed the meeting of the Boston chapter of Phi Beta Kappa, of which he is Vice-President, on the subject of physical and social analogies. A newly established system of succession in office will bring him to the chair as President of the Chapter next May.

Gifts From the Orient

FROM alumni groups in China and Japan, the Institute has lately received gifts which bespeak the lively and generous interest felt for Technology by its graduates half a world away. A check for $50 was recently received by Dr. Allan W. Rowe, '01, Secretary of the Advisory Council on Athletics, from Mann C. Chan, '26, Secretary of the Shanghai Technology Club, as the gift of that group toward Institute athletics. The Technology Club of Japan, through its President, Takanaga Mitsui, '18, has presented the Institute with $200.

Institute of Aeronautical Sciences

DR. JEROME C. HUNSAKER, '12, Head of the Department of Mechanical Engineering, was elected to honorary fellowship in the Institute of the Aeronautical Sciences at its annual meeting in New York on January 31. With Dr. L. Prandtl of Göttingen, he shared an honor which to date has been conferred only upon Orville Wright. Dr. Hunsaker is outgoing President of the organization, and editor of its journal, the initial number of which appeared in January. At the recent meeting, he presided at a series of discussions on trends in the several fields of aeronautical science.

Of the five officers chosen to head the I.A.S. during the coming year, three are Technology graduates. They include D. W. Douglas, '14, Vice-President; E. E. Aldrin, '17, Treasurer, and L. D. Gardner, '98, Secretary.

Among the 23 fellows elected, Institute men included Professor Charles F. Taylor, '29, in charge of M.I.T.'s automotive engineering laboratory; Professors Charles H. Chatfield, '14, and Alexander H. Klemin, '16, former members of Technology's staff; Mr. Douglas, and Holden C. Richardson, '06.

Professor Taylor disclosed a theory of detonation which explains knocking in gasoline engines as autoignition of the unburned charge when pressure and temperature in the cylinder due to normal combustion reach a critical point for a particular fall (see page 228).

Air mass analysis in weather forecasting was discussed by Professor Hurd C. Willett and visiting Professor Jacob Bjerknes, who described the applicability of Technology's airplane weather flights to a better understanding of weather changes. Professor Richard H. Smith, '18, spoke on the theoretical basis for airplane vibration study and wing flutter.

The discussion on aerodynamics was led by Professor Chatfield, while Professor Klemin discussed airplane design and new devices in this field. Luis de Florez, '12, spoke on aircraft fuels, and Captain Arthur R. Brooks, '17, explained the limitations and future possibilities of aircraft radio.

The first issue of the *Journal of the Aeronautical Sciences* carried articles by Dr. Hunsaker, Professor Smith, Professor Carl G. Rossby, and Athelstan F. Spilhaus, a graduate student at the Institute. It is also interesting to note that more than one-sixth of the members of this organization are Technology men.

Mrs. Francis Amasa Walker

MRS. FRANCIS AMASA WALKER, widow of the third President of Technology, died at her home in Brookline, Mass., on February 3. She was in her 94th year. She is survived by two daughters, Miss Evelyn and Miss Lucy Walker, '89, and four sons, Stuart, Ambrose, '91, Francis, '92, and Ethelredge, '99.

Née Exene Stoughton, she was married to General Walker in 1865 upon his return from a brilliant military career with the Union forces. As first lady of the Institute during General Walker's distinguished administration from 1881 until his death in 1897, Mrs. Walker witnessed the transition of the struggling technical school into a great scientific institution. Her long life span permitted her to see, as he could not, the fruits of those unstinting labors to which Walker Memorial is gratefully dedicated.

Tribute to Professor Merrill

PROFESSOR ALLYNE L. MERRILL, '85, who for 27 years has been Secretary of the Institute faculty, and who will retire with the title of Emeritus Professor next fall following a leave of absence during the second term, was the guest of nearly 200 members of the staff at a luncheon at Walker Memorial on February 8.

This tribute had its inception in a plan for a small luncheon by some of his intimate friends, but other faculty members, hearing of it, asked that it be enlarged so that they might participate.

Born in Cambridge in 1864, Professor Merrill was graduated from Technology with the degree of bachelor of science in mechanical engineering. Following his graduation, he became an assistant in the mechanical engineering laboratories, and in 1887 was made instructor. Three years later he became Assistant Professor, and in 1905 was appointed to full professorship. Elected Secretary of the Faculty in 1907, he has since served continuously in that capacity. He is now Senior Professor in the Mechanical Engineering Department.

Miscellanea

ANNOUNCEMENT was made at mid-term of the award of academic degrees to 100 Technology students whose candidacy had been approved later than June, 1933. Inasmuch as most of the recipients had completed their work some time earlier and had left the Institute, the diplomas were issued by mail.

The graduates include eight doctors of philosophy, seven doctors of science, 37 masters of science, two bachelors of architecture, and (*Continued on page 239*)



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GEOLOGY IN THE COLONIES

(*Continued from page 217*)

mined at Richmond, Va., and the work was promptly forbidden by Parliament. Almost at the same time, Parliament enraged Massachusetts by suppressing the iron furnace at Middleboro. I think these were the first mineral ingredients cast into the witches' caldron of troubles that brewed the Revolution. Lead mines were opened in Worcester County, Mass., in 1754, and were destined to make bullets for the Rebels. The iron mines now included the magnetite of the ancient crystalline rocks in the Berkshires, the Adirondacks, and the New Jersey Highland.

The coming of the Revolution gave a great impetus to the development of mining. The country was cut off from European supply and faced by the increasing need of the three great metals — iron, copper, and lead. Among the many iron mines that brought forth cannon, shot or camp-kettles, tool steel, nails, guns to the Revolution were: the Amenia Mine of Dutchess County, New York; that of Andover, New Jersey, which was held by Royalists until Congress took charge of it, because of the excellent steel which its magnetite ores furnished; and the Mount Hope and Hibernia magnetite mines, whose cannon and shot were so important that the workers were exempted from army service.

The French Creek copper mine in the brownstone lowland, near St. Peters in Chester County, was one of the most important ore bodies of that period. General Washington worked a mine in the Brownstone Lowland of New Jersey, near Bound Brook, in 1778, and obtained enough copper ore to make a brass cannon which he used at Yorktown.

The Revolution boom fittingly closes our brief review of Colonial mining. Let us draw an antiseptic oblivion over the post-war depression and read about something else.

The colonists were slow to use coal when wood was so plentiful that it seemed a virtue to cut down the trees. But even in the Seventeenth Century we began to hear warnings that the curse of the iron industry might destroy our forests as it had those of England. In 1750, when Parliament closed the soft-coal mine in the Richmond basin, daring pioneers in the folded sandstone ridges of Pennsylvania were trying to burn "stone coal" — anthracite — by powdering it upon charcoal fires. Not until 1769 was it successfully burned as fuel by the Connecticut blacksmith Obadiah Gore at Wilkes-Barre. Anthracite, like a good patriot, went to the Arsenal at Carlisle to help make guns for the Revolution. The coal traveled by river to Harris Ferry (Harrisburg), and thence by wagon to Carlisle. During the dark year 1778, Judge Jesse Fell of Wilkes-Barre burned stone-coal in a nail-factory — the first industrial use of anthracite. So difficult was communication in those days that Philadelphia was still powdering the anthracite and sprinkling it upon charcoal a generation after the blacksmiths of Wyoming Valley had burned it successfully in their forges.

(*Concluded on page 238*)

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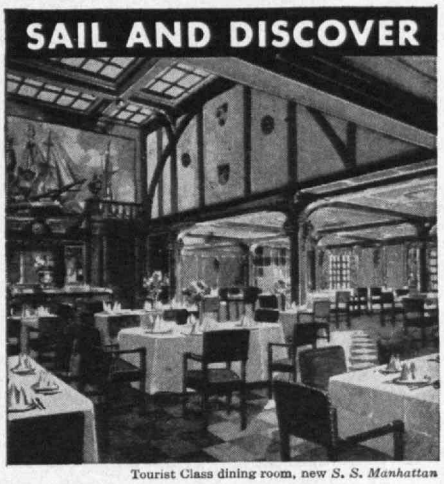
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GEOLOGY IN THE COLONIES

(*Concluded from page 236*)

A pre-Indian people may have known petroleum, for in Pennsylvania there are ancient oil pits lined with jointed timbers such as the Indians could not make. The pits were choked with soil and overgrown by huge trees. The Indians used petroleum to cure toothache, rheumatism, and nearly all other ills that flesh is heir to. As early as 1670, the oil spring near Cuba, N. Y., was mapped by two French missionaries, and in 1700 the Governor of New York sent an engineer named Romer into the far wilderness of the Five Nations to see a spring "which blazes up in a flame when a lighted coal or firebrand is put into it." The colonists used the oil as a laxative, and as a treatment for rheumatism, but no serious practical development of petroleum was attempted.

IT WAS natural that the colonists should turn their attention to the practical use of resources rather than to a scientific study of their geology. But their eager intelligence led them to interpret their observations of Nature, even though their lack of the very foundations of the science caused them to interpret erroneously.

The West River Mountain in New Hampshire was explained as a volcano containing gold, and honest but suggestible witnesses saw fires and heard great noises in the hill. Professor Winthrop of Harvard lectured on earthquakes in 1755 — "the year when Lisbon Town saw the earth open and gulp her down." The earth, he believed, was honeycombed with long crooked caverns connecting distant regions; some contained air and the fumes of fermenting minerals; others contained running water. Particles rushing together in the caverns generated heat, the heat caused fire, and the fire caused earthquakes.

After the English captured Fort Pitt in 1758, the brave scout, George Croghan, made his home there; and in May, 1765, he set out to explore the Ohio River. He discovered the Big Bone Lick in Kentucky, and recognized that huge beasts had died there long ago. After a later visit, he sent some of the bones to Ben Franklin, then in England, who believed that they were elephants despite the high cusps on their teeth which led some authorities to class them as flesh-eaters. Franklin knew of the mammoth elephant-bones of Siberia and believed that they had been washed there from India by the great Flood; but the Mastodons of the Big Bone Lick could not be so explained; he suggested that the poles of the earth must have changed. This inference was not a heresy in his day, but our young science still awaits the happy demise of the last believer in frisking poles. Incidentally, it was Thomas Jefferson who paid for the exploration of Big Bone Lick. He was one of our first palæontologists, and studied collections of fossil bones even in the White House.

To Colonial scholars, the Deluge was not a problem to investigate, but a primary fact to reason from. Professor Winthrop's caverns were needed to hold the fountains of the deep from which the Deluge rose, and to receive the waters when the Flood went down. Our chief textbook of geology was still the Book of Genesis. Geology did not take shape as a science in America until the second decade of the Nineteenth Century.

INFORMATION

THE TECHNOLOGY REVIEW BUREAU exists to supply authoritative information to anyone interested in details regarding the Massachusetts Institute of Technology. It serves as a clearing house for inquiry and aims to further the spread of exact information regarding entrance requirements, outline of courses, subjects of instruction and other information which may be of aid to the students considering undergraduate or graduate study at the Institute.

The Institute publishes a variety of bulletins, fully descriptive of individual courses, as well as a catalogue of general information essential to the entering student. The Technology Review Bureau will be glad to send, gratis and post free upon request, one or more copies of any publication listed below, or to forward any special inquiry to the proper authority.

Ask for the following circulars by their descriptive letters:

AB: For general information, admission requirements, subjects of instruction, ask for Bulletin AB.

C: For announcement of courses offered in Summer Session, ask for Bulletin C.

D: For information on Advanced Study and Research Work, ask for Bulletin D.

E: For the reports of the President and of the Treasurer, ask for Bulletin E.

Y: For a popularly written explanation of Engineering Courses, ask for Bulletin Y.

All inquiries sent to the address below will receive prompt attention

THE TECHNOLOGY REVIEW BUREAU

ROOM 11–203, MASSACHUSETTS INSTITUTE OF TECHNOLOGY, CAMBRIDGE, MASSACHUSETTS

PROTEAN PLASTICS

(*Concluded from page 224*)

may be derived from the fact that since 1920 the production of phenolic resins alone has risen from 4,000,000 pounds to 33,000,000 pounds. This greatly increased domestic production has resulted in a substantial export business in laminated sheets and plates and other phenolic resin products, which now find a market in 27 countries.

Many of the synthetic resins may be readily bonded to sheets of such material as steel, wall board, Celotex, or asbestos board for the production of wall panels, elevator cages, table tops, and a great variety of other uses. The resin surfaces are made to closely reproduce the grain, color, and finish of the finer woods, or they may carry decorative designs of unusual richness and beauty. As these surfaces are entirely resistant to atmospheric influences and may be washed, they lend themselves exceptionally well to interior decoration. When bonded with fireproof material, as steel or asbestos, they should find wide application in the finish of Pullman cars and the interior finish of steamships. The rapidly developing technique of the plastics industry is permitting the production of objects of constantly increasing size, and there are those who look forward confidently to the one-piece moldings of small boats, and automobile and airplane bodies. The resin bath tub has already arrived.

Plastics afford ideal materials for the attainment of machine-made beauty in our Machine Age, and their characteristics and properties are such that they afford to the imaginative worker or the creative artist a new and exceptional medium for expression.

The present insistent demand for color in the bath room and the kitchen, as well as in containers and small articles of all sorts, is rapidly extending the demand for plastics, but the great expansion of the industry may be expected to come from their general application to materials of construction.

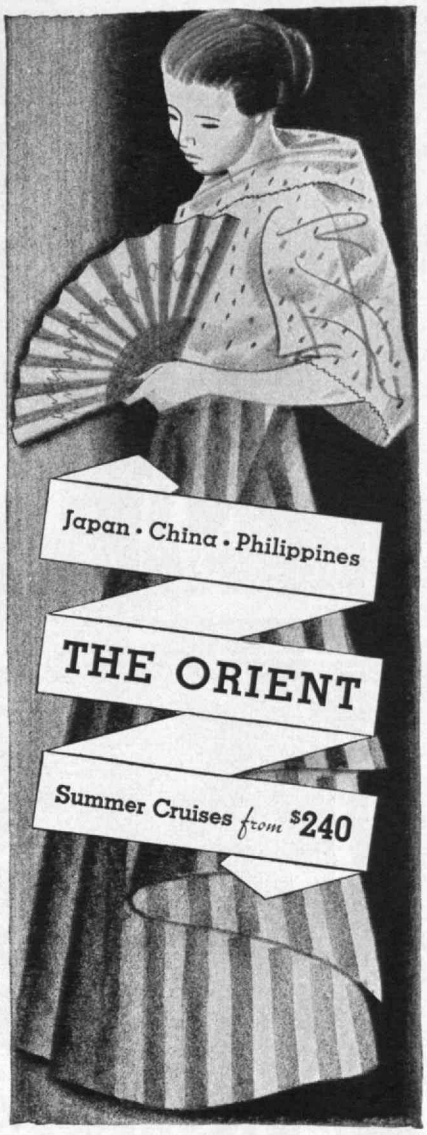
THE INSTITUTE GAZETTE

(*Continued from page 234*)

42 bachelors of science. Four students in the coöperative course in Electrical Engineering received both the degrees of bachelor and master of science.

¶ As a result of the success of last year's series of science and engineering exhibits, which brought nearly 700 high and preparatory school students and teachers to the Institute, a similar series has been arranged for Saturday afternoons this spring from March 3 to April 7. The program of exhibits and experimental lectures will include some of the most interesting new developments in biology and public health, hydraulics, naval architecture, mining and geology, physics, chemistry, and electrical, mechanical, aeronautical, and chemical engineering.

(*Continued on page 240*)



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THE INSTITUTE GAZETTE

(*Continued from page 239*)

¶ Professor Kenneth C. Reynolds, '25, of the Department of Civil and Sanitary Engineering, led the discussion of the waterways division at the annual meeting of the American Society of Civil Engineers in New York on January 18.

¶ "Sound and Silence" — the striking advances made by science in the control of musical production and the elimination of noise — were described by Professor Philip McC. Morse of the Physics Department in the third Society of Arts popular science lecture on February 11.

¶ Professor William Hovgaard addressed members of the American Academy of Arts and Sciences in Boston on February 14, on the subject of "Fundamentals of the Theory of Relativity."

National Nominating Committee

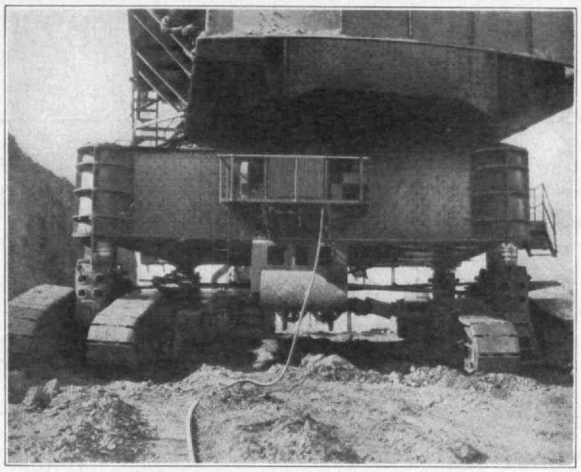
BELOW are presented the first nominees for membership on the National Nominating Committee of the Alumni Association. Last year the alumni body ratified for a trial period of three years a new Alumni Association constitution which provides for this National Nominating Committee. This committee, consisting of one representative from each of ten electoral districts, is charged with the duty of nominating officers of the Alumni Association and Term Members of the Corporation and replaces the committee of the Alumni Council which has done this in the past.

The Chairman of this National Nominating Committee is the representative of the Boston Postal District, elected from nominations made by the Alumni Council. Each other candidate for the committee should be formally nominated by 50 residents of his district, and in lieu of such formal nomination, the Alumni Council selects nominees after asking for suggestions from alumni clubs. It is disturbing that this year only three districts have formally nominated candidates (designated below by two asterisks). More encouraging is the fact that of the 26 nominees selected for the nine districts outside of Boston, 17 were recommended or nominated by alumni clubs. Wherever possible, the Executive Committee of the Council based its selection upon club recommendations (designated below by one asterisk).

The entire alumni body will ballot to select representatives in each district, and in every district may choose from several nominees. Ballots containing the following names will be mailed by March 10:

District 1. Boston Postal District. H. J. Carlson, '92; M. L. Emerson, '04; H. B. Richmond, '14.

District 2. Maritime Provinces, Newfoundland, Labrador, Quebec, Maine, New Hampshire, Vermont, Massachusetts, east of western boundary of Worcester County, except Boston Postal District. A. E. Hirst, '13* (Fall River); F. E. Everett, '00* (Concord); W. H. Dow, '89* (Portland). (*Continued on page 242*)

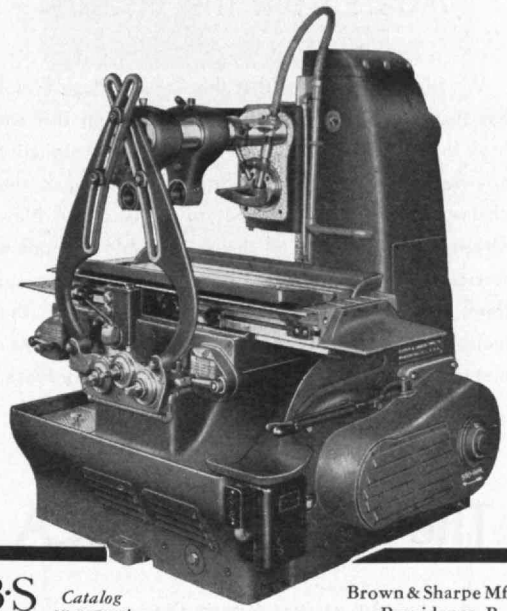


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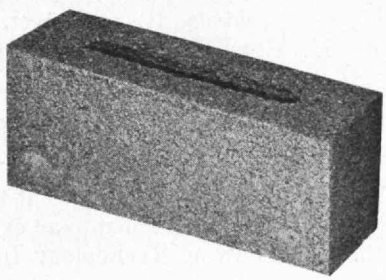
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(*Continued from page 240*)

District 3. Massachusetts west of Worcester County, Rhode Island, Connecticut. E. O. Hiller, '04** (Hartford); H. A. Fiske, '91 (Providence); P. B. Stanley, '06 (New Britain).

District 4. Ontario, New York State except New York City and Long Island. J. F. Ancona, '03** (Rochester); E. J. Hanley, '24* (Schenectady).

District 5. New York City (boroughs of Manhattan, Brooklyn, and Bronx), Long Island, New Jersey. J. A. Burbank, '16 (New York City); P. H. Thomas, '93 (New York City); D. R. Linsley, '22 (New York City).

District 6. Pennsylvania, Delaware, Maryland, District of Columbia, Virginia, West Virginia. L. S. Morse, '96* (York); F. J. Chesterman, '05** (Pittsburgh); W. S. Rodman, '09* (Charlottesville).

District 7. Ohio, Indiana, Illinois, Michigan, Wisconsin, Kentucky. R. E. Wilson, '16* (Chicago); H. W. Green, '16* (Cleveland); R. P. Dinsmore, '14 (Akron).

District 8. North Carolina, South Carolina, Georgia, Florida, Tennessee, Alabama, Mississippi, Arkansas, Louisiana, Oklahoma, Texas, Mexico, Central America, Canal Zone, Panama, West Indies, and all islands in the Caribbean. H. M. Mansfield, '83 (Tampa); H. W. Webb, '09 (Memphis); C. B. Capps, '20 (Fort Worth).

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District 10. Oregon, Washington, California, Nevada, Alaska, British Columbia, Yukon, Northwest Territory, Hawaii, Philippine Islands. R. S. Breyer, '10* (Los Angeles); W. H. Crowell, '05* (Portland); H. W. McCurdy, '22* (Seattle).

170th Council Meeting

EIGHTY-FOUR members and guests at the Council meeting on January 22 listened to an extended discussion of the subject "Can Technology Improve the

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Quality of Its Entering Classes?" in which representatives of prominent high and preparatory schools and Institute officials participated. Following the short business meeting, President Proctor introduced Dr. J. L. Tryon, Director of Admissions at Technology, who took charge of the discussion.

Dr. Tryon first outlined the work of his office as follows: Our students come from secondary schools, colleges, and universities. Considering especially those from the secondary schools, entering primarily as freshmen, or with some advanced standing, admission may be by examination under the College Board in June, or under Technology in September, or under the New York State Regents, or without examination, by virtue of having a high record in an accredited secondary school, the requirements being that a candidate should have been in the upper fifth of the entire class, and be recommended by the Principal and others. All other evidence regarding the man is taken into consideration. Students coming with advanced standing are designated as college transfers, and are dealt with as individuals, credit being given for such work already accomplished as appears to be equivalent to similar work at Technology. There is no fixed numerical limit to registration. Doubtful cases are investigated very thoroughly before final decision is made. The Admissions Office does a great deal for recruiting of students. All inquiries are answered in complete detail. A great deal of literature is distributed, and during the course of the year many personal interviews are held with applicants, or their parents, or both together. In addition to this office work, the Director visits other institutions and secondary schools for the purpose of creating a popular understanding of the nature and purpose of engineering education and, furthermore, to acquaint other institutions with our special facilities for graduate work, with the idea that a man contemplating further study or research should be fully informed on our facilities. Dr. Tryon's visits have carried him into almost every state of the Union and, while his visits are primarily to schools, he has held meetings with other organizations, such as Rotary clubs, professional societies, alumni groups, and many others. Other publicity includes special departmental bulletins, the work of Honorary Secretaries (86 in number) who are administrative officers of the (*Continued on page 244*)



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THE INSTITUTE GAZETTE

(*Continued from page 243*)

Institute, as well as local representatives of the Alumni Association, various scholarship announcements, the Society of Arts lectures which always have a crowded attendance, The Technology Review, *The Tech Engineering News*, and the annual spring open house. In addition, during the year groups of students from secondary schools visit the Institute on Saturday afternoon under the direction of J. J. Rowlands.

Dr. Tryon next called upon Mr. Walter F. Downey, Headmaster of the English High School of Boston, who agreed that the greatest publicity for us is that Tech is Tech. He felt that we were losing some high quality men who did not feel that they could afford to come to Technology and went to other less costly schools. The remedy, as he saw it, was more scholarship aid for freshmen. He presented charts which showed the correlation between groups of high-standing students in the high school and similar groups in Technology. While there is a little shifting of positions, his figures showed that men who stood well in their classes in the high school would stand among the high groups at Technology.

Mr. Homer W. LeSourd, Head of the Science Department of Milton Academy, when called upon by Dr. Tryon, pointed out the wide variety in requirements of preparation by higher institutions of learning, which made it desirable that the students in secondary schools should decide upon the college that they planned to enter and select their preparatory studies accordingly. He believes strongly in the value of viewing the candidates, and in studying the records and personal qualifications. Before closing, he discussed the so-called Plan B for admitting students to colleges, which supplies a lot more information regarding the student than is obtainable from examinations alone. Consideration should be given to the man's grades, to the teachers' estimate, and not more than four final examinations should be given. A questionnaire to be filled out would supply valuable information, although Mr. LeSourd felt that it was very difficult for the man in charge of a secondary school to give satisfactorily all the information asked on some of the questionnaires put out by colleges, which called for specific estimates of many characteristics of the student. He felt that pertinent information regarding candidates for admission might be included under four main headings, with subject headings as follows:

I Health:	Frequently absent from school because of illness?
	Athletic ability.
II Attitude:	Serious-minded?
	Ambitious (a) for immediate excellence?
	(b) for success in life?
	Working for love of subject or for grades?
	Honest and frank?
	Persistent?
	Coöperative?
III Interests:	Intellectual curiosity?
	Consider the implications of facts and principles?
	Reader of scientific literature?
	(of the shallow or the deeper variety?)
	Scientific hobbies?
IV Abilities and Skills	Slow or fast in acquiring new ideas?
	Skill in mathematical calculations and manipulations?
	Ingenuity and creative ability?
	Careful in observing and recording data?
	Careful in drawing conclusions?
	Neat in written work and drawings?

(*Concluded on page 246*)

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THE INSTITUTE GAZETTE

(Concluded from page 244)

The three preceding were the scheduled speakers of the evening, but a number of guests were present who represented various secondary schools, and these were introduced in turn and spoke briefly. Mr. John Wood, Headmaster of the Rindge Technical School of Cambridge, questioned the value of the modern language requirement, and expressed the belief that the time devoted to this subject might be spent to better advantage on mathematics, especially for men entering engineering and scientific institutions. Mr. L. L. Cleveland, Headmaster of the High and Latin School of Cambridge, dwelt upon character as a quality desirable, and even essential, including not only moral character, but the man's characteristics. Mr. Wilfred H. Ringer, Headmaster of the Brookline High School featured the human side of the student, and suggested that it would be very helpful to him, and others in a similar position, to have us report back to him how his men were succeeding with us individually. From such reports he would be guided in future work, and particularly in adapting the educational program of the senior year in the secondary schools to the needs of men who were coming to us. Harry F. Cade, Jr., '28, Principal of the Berkeley Preparatory School in Boston, expressed strongly his belief in the value of the opinion of the school principals as being of far greater benefit to us than the results of examinations. To overcome partly the gap between the so-called spoon-feeding instruction methods of secondary schools under class supervision of the teachers, and the condition in colleges where the man is to a considerable extent left to his own initiative, and working without full supervision, he urged that the preparatory schools begin to develop the man to work on his own while they have him in charge.

Three Technology officials next contributed their ideas, Dean Bush, Dean Prescott, and Dean Lobdell. They were in agreement on the great value of the personal estimates on candidates made by teachers in preparatory schools, and agreed that it was the character and characteristics of the man that counted most.

Mr. John Lund, Superintendent of Schools in Newton, and Mr. Wade L. Grindle, Principal of the Winchester High School, contributed to the discussion. Mr. Lund believed that a complete record of the candidate, beginning in the kindergarten, should be available.

Dr. Compton, who was obliged to leave during most of the discussion, having returned, expressed his appreciation of the various speakers and guests for their valuable contribution of ideas and, finally, Mr. Percy R. Ziegler, '00, said a few words from the alumni viewpoint. Since the hour was ten o'clock, the meeting was formally adjourned, although it was felt that the discussion might have continued with much profit, and especially have given an opportunity for members of the Alumni Council to express their views and make suggestions.

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NEWS FROM THE CLUBS AND CLASSES

CLUB NOTES

Technology Club of New York

The Technology Club of New York is happy to welcome the following new members into its fold: Raymond C. Rundlett '22, Francis P. Squibb '23, William J. Barrett '16, Joseph Shea '24, Norman P. Dana '20, E. S. Goodridge '33, Richard L. Ahearn '16.

Activities at the club are gathering speed. The first of a series of weekly class luncheons was held on January 12, at which members of the Class of '16 spread themselves about the table to talk about and to each other (more details on this in the class notes). As a number of other classes have signified their intention of embracing the idea, it appears that these luncheons may develop into a permanent and enjoyable feature of the club's program.

During the months of February and March a series of weekly bridge contests will supplement the annual spring and fall tournaments. For those who do not care to play duplicate contract, tables for individual players are to be provided.

The success of our evening beer parties has inspired the program committee to schedule several more for the succeeding months this spring. It is planned to have some interesting topic for discussion, and if the attendance approximates that at previous meetings, members will have to make reservations in advance.

Drawings for the first ping-pong tournament are soon to be made. Since its installation, the ping-pong table has interested some of our livelier members in the possibilities of reducing surplus poundage from the bay windows. Further progress reports on the success (or otherwise) will be made later.

The cherished painting "Archimedes and the Sylph" by our beloved member Ike Hazelton, which for so long has graced the walls of the club, has been donated to the club in perpetuity by its creator. Our thanks cannot be too sincerely expressed to Ike for his magnificent gift. The club would never seem the same without Archie and his companion!

Efforts to help Tech men locate jobs are continuing unabated. In the first two weeks of the new year the club has been successful in placing one man in a permanent position, and it hopes, with the help of its members, to exceed the record it made last year when it placed 53 men. — MILTON MALE '29, *Assistant Treasurer*, 71 Broadway, New York, N. Y. LELAND D. WILSON '20, *Secretary*.

Technology Club of Central Florida

On December 14 a group of Technology alumni met for an informal dinner at El Boulevard Café in Tampa. The meeting was arranged by the club and members were in attendance from St. Petersburg, Bradenton, Sarasota, Winter Haven, and Tampa. Those present were: H. M. Mansfield '83 (President), A. W. Higgins '01, E. V. Sedgwick '84, W. H. Leathers '03, Anton K. Whitaker '23, W. B. Newell '17, Max J. Mackler '17, Franklin O. Adams '07, Charles F. Kuhn '25, and the Secretary. — M. R. MCKINLEY '19, *Secretary*, Tampa Electric Company, Tampa, Fla.

Technology Club of Shanghai

The 11th meeting was held at the Chinese Bankers' Club on December 15. Thirty-two members and one guest attended. The hosts for the evening were H. J. Wu, T. S. Sih, P. C. Loo, M. T. Hsu, C. P. Hsueh, Y. H. Sun, and S. L. Yang. In the absence of the President, the Secretary acted as chairman.

The meeting was called to order at nine P.M. The minutes of the last meeting having been accepted, the chairman thanked the hosts, welcomed our guest, Mr. Lott Wei, and two out-of-town members, Y. F. Lee, from Tsingtao, and P. Y. Hu, from Nanking, rose to introduce themselves. The chairman reported that U. S. $50 had been sent over to Dr. Allan W. Rowe for contribution to the Alumni Athletic Fund.

The nominating committee was called upon to present candidates for 1934 officers. It was unanimously voted as follows: President, K. T. Lee '19; Secretary-Treasurer, Z. Z. Li '22; and Assistant Secretary-Treasurer, T. C. Wang '25.

The new President was called upon to address the members. He expressed thanks for the honor bestowed on him and pledged his services to the club. To conclude the meeting at 10 P.M., W. A. Adams proposed a toast to the retiring President. — M. C. CHAN, *Secretary*, Box 434, Shanghai, China.

Technology Club of Eastern and Northern Maine

Thirteen members of the Bangor alumni club attended an informal dinner at the Bangor House on January 10, with Dr. James L. Tryon as guest of honor and speaker. Charles M. Cooper presided at the dinner and plans were discussed for a later meeting in the spring.

Dr. Tryon was introduced by Mr. Cooper and he spoke of changes in organization and administration at M. I. T. and of recent problems arising in education. He himself is internationally known for his work in vocational education.

Present at the meeting were: Dr. Tryon, Harold S. Boardman, President of the University of Maine, Charles M. Cooper, Charles Paine, W. L. Sweetser, I. C. Lyon, Miss Gertrude E. Ebbeson, Carl E. Danforth, Eugene Downing, Hugh G. Chase, H. Elmer Hall, P. F. Eckstrom, and Haven Sawyer. — CHARLES M. COOPER '25, *Secretary*, M. I. T. School of Chemical Engineering Practice, Eastern Manufacturing Company, Bangor, Maine.

Technology Club of Rochester

Coming just two days on the right side of repeal, the Technology Club of Rochester held a highly successful meeting on December 7, 1933. A private room at the University Club of Rochester proved to be an excellent location for the dinner preceding the meeting, a dinner that was marked by good fellowship and high spirits on the part of all present. Thirty-eight members attended, and a number of these were men who had not been active in recent years. We hope that they have been won over to active support of the club, and that others in the Rochester area will make a fresh start and join in our future meetings.

Our guest at the dinner meeting was Dr. Warren K. Lewis, Head of the Department of Chemical Engineering at the Institute. Dr. Lewis gave an inspiring talk concerned with the ideal of technical education. He pointed out that our educational ideal should be training for service, that the true function of the engineering profession was one of service to the needs of humanity. The use of the problem method of instruction, and the recent introduction of honors groups of qualified students were cited as examples of ways in which the Institute is striving to develop individuality of thought, based on initiative, that is so essential for useful, creative work.

We were pleasantly surprised to have an additional guest in the person of Bursar Horace S. Ford, who happened to be in Rochester on business at the time of our meeting. The Bursar's brief report on the state of affairs on the banks of the Charles River was highly encouraging. In fact, it seemed that the Institute, in these years of the Great Depression, has been forging ahead at a great rate. One sound improvement has followed another, pointing toward increasing effectiveness in the work that is being carried on at Technology. — HOWARD S. GARDNER, JR. '30, *Secretary*, Building 46, Kodak Park, Rochester, N. Y.

Technology Club of Panama

Eduardo Icaza '23 came into the office the other day to discuss cold storage plants. Apparently there is a demand in Panama City for a cold storage plant; shippers and local merchants who deal in butter, eggs, vegetables, fish, and other perishable goods need space for temporary and transient storage. Icaza's company, Icaza and Company, Panama, R.

de P., plans to construct about a dozen cold storage rooms, two or three fairly large rooms and the rest small, with temperature controlled and so arranged that a merchant may use one room or several together, all at proper temperature as needed. The location of Icaza's proposed plant is on the corner of Calle Nueve and Avenida A. Herrera Plaza, Panama City, an old building owned by Icaza's family, probably one of the oldest buildings in the present Panama City, long and rambling with thick rubble masonry walls. We discussed insulation cork, pure asphalt, bunkers, coils, machinery, floor finish, paving brick, wall finish, cold storage doors, and other details of cold storage construction. I gave him the names of some manufacturers who supply this material. Cold storage rooms require very careful and special design and construction, walls and floor should have six inches and ceiling eight inches of cork insulation in two-inch layers, laid with pure asphalt, and complete all around, no breaks through the walls anywhere, like a room within a room. Over the floor cork there should be a membrane waterproofing, then three or four inches of concrete for finish, paved if desired, then cast iron columns properly spaced and of proper height to support a ceiling of laminated board construction so that the ceiling is flush top and bottom. Over this is laid the ceiling cork.

Austin W. Brooks, engineer, Madden Dam, has returned from his vacation in Boston. Work on the dam seems to be progressing rapidly. — During the absence of the Office Engineer of the Panama Canal, Lewis B. Moore '26 has been Acting Office Engineer, reporting to Major W. E. R. Covell '23, Assistant Engineer of Maintenance.

The Cosmopolitan Club of Technology will be interested in reading an article in the *Journal of Chemical Education* for December, 1933, on "Chemical Terms in the Chinese Language" by Ma Ling-Yun and Hanor A. Webb. The Chinese character for atom requires more lines to represent it than the character for molecule does. Professor Locke probably already knows that Charles is pronounced Chá li in Chinese and means "search for truth." — In the same number of the magazine mentioned above is an article by D. B. Keyes on "Development in Chemical Education" in which the writer refers to "an interesting question in pedagogy" and states that the "practice school methods" as used at the M. I. T. have proven very successful. — MEADE BOLTON '16, *Secretary*, Balboa Heights, Canal Zone.

Washington Society of M. I. T.

The annual election and luncheon meeting of the Washington Society of M. I. T. was held at the University Club on December 15, 1933, and this report must be somewhat limited as to the discussion, as the meeting was an open forum for Technology men in the New Deal, in the nature of an executive session.

Following the luncheon our President, Dr. Tyler, called the meeting to order and called upon the Nominating Committee for its report. Upon motion of the Nominating Committee, duly seconded, vote was taken and the following officers elected for the ensuing year: *President*, Harry W. Tyler '84, 26 Jackson Place, N. W., Washington, D. C.; *Vice-President*, William K. McMahon '22, 408 Green Avenue, Aurora Hills, Va.; *Secretary*, J. Y. Houghton '26, 406 Munsey Building, Washington, D. C.; *Treasurer*, C. H. Godbold '98, Bureau of Construction and Repair, Navy Department, Washington, D. C.; *Executive Committee*, the foregoing *ex officio;* Allan Pope '07, 4722 Fifteenth Street, Washington, D. C.; H. E. Whitaker '09, Reconstruction Finance Corporation, Washington, D. C.; Amasa M. Holcombe '04, 406 Munsey Building, Washington, D. C.; and Proctor L. Dougherty '97, Honorary Secretary, National Press Building, Washington, D. C.

The remarks concerning the New Deal were introduced by H. E. Whitaker '09 who explained the functions of the Reconstruction Finance Corporation (RFC), laid certain rumors concerning its work, and gave several case summaries illustrating involved and interesting situations with which it is dealing.

The functioning of the Public Works Administration (PWA) was then set forth by A. L. Sherman '06; and Francis Walker '92 explained the relation of the Federal Trade Commissioner to the New Deal and the activities which it expected to exercise in connection with the NRA.

Howard P. Emerson '28 was called upon to explain the functioning and preliminary work being done by the Tennessee Valley Authority (TVA), after which our President introduced Francis Walker, 3rd, '30 to the assembled multitude.

Our newly elected Vice-President, William K. McMahon '22 then called upon A. B. McDaniel '01 to explain to the society how the backing of the RFC was obtained for certain bond issues; after which the old controversy between the Supervising Architect's office of the Treasury and the Public Works Administration was again raised by K. P. Armstrong '10 and deftly parried by Professor C. W. Doten, who at the same time announced his affiliation with the Public Works Administration.

With the coöperation of the Alumni Office of the Institute, a list of undergraduates resident in Washington was obtained, and each of them was sent the regular notice of the Annual Undergraduates' Luncheon held at the University Club on December 29, 1933, with the result that the Society entertained as its guests 13 of the undergraduates who were in Washington for the Christmas Season.

Following the luncheon the Vice-President, Mr. McMahon, introduced as the first speaker Proctor L. Dougherty, Honorary Secretary of the Washington area, who explained to the undergraduates the work that he and the society are trying to do in collaboration with the Placement Office of the Institute.

Following remarks by A. M. Holcombe '04 and Professor C. W. Doten, the undergraduates were called upon to identify themselves with remarks as to their present activities and hopes for the future.

R. O. Marsh '05 was then called upon to introduce Major Olberg, speaker of the occasion, and briefly recalled to the members his extensive activities in connection with the Coolidge Dam, his employment as technical adviser for four years by the Government of Soviet Russia, and his recent return to enter the services of the Public Works Administration.

Major Olberg prefaced his remarks by explaining that in his four years in Russia he had found conditions neither as radical as painted in the majority of books nor as rosy as painted in the minority, but more or less as anywhere else except for the special conditions arising from the Soviet philosophy of government.

He proceeded to explain the differences between the military sabotage and industrial sabotage laws and informed the society that all engineers are required in their contracts to agree to "disclose none of the secrets of the Soviet." In connection with his contract he inquired as to how he would know whether a particular thing was a "secret of the Soviet" or not and finally succeeded in having a clause written in that he would be advised definitely as to each item considered a "secret of the Soviet," but stated that in his four years as technical adviser not once was he informed that any particular item was not to be disclosed.

Major Olberg then proceeded to explain the very real fear held in Soviet Russia of the expansion aims of Japan and outline the aims of the first and second five-year plans which he explained are primarily intended to perfect Russia's military defense, particularly against aggression from the Far East.

Tending to a lighter vein, Major Olberg then explained the working of the housing laws, and how occupancy of quarters gives to the occupant a vested right to remain, so that even if a servant is discharged that servant has the right to remain in his quarters on the premises. Major Olberg explained that this law had been of peculiar benefit to him as it had enabled him to enlist the Ogpu to evict a high Soviet official who had taken possession of the Major's quarters during his absence on a business trip.

Major Olberg explained his belief that the Soviet experiment would eventually succeed and lead to an organized form of state capitalism, and his remarks were concluded by answers to numerous questions asked him by those present.

The *undergraduate guests* of the Society included the following: Arthur L. Conn '34, Frank S. Walters '35, Karl H. Achterkirchen '35, Edward K. Dougherty '35, Leonard S. Wiener '35, Towers Doggett '36, Thomas C. Terry, Jr. '36, John E. Talbert '35, John G. Brunner '34, John T. Fisher *G*, Edgar B. Chiswell, Jr. '34, Henry B. Backenstoss '34, Marshall M. Holcombe '36. — J. Y. HOUGHTON '26, *Secretary*, 402 Shepherd Street, Chevy Chase, Md.

CLASS NOTES

1876

At the 81st Annual Meeting of the American Society of Civil Engineers on January 17, the John Fritz Medal was posthumously awarded to John R. Freeman. This medal is considered the highest award in engineering and was presented for his "eminence in the fields of hydraulics and water supply, fire insurance economics, and analysis of earthquake effects." Since Dr. Freeman died on October 6, 1932, before completion of the formal procedure of election as medalist, the medal was received by one of his sons, John Ripley Freeman, Jr., selected by the family as its representative. — CHARLES T. MAIN, *Secretary*, 201 Devonshire Street, Boston, Mass.

1877

The following news item appeared in the Sunday *Herald*, January 7, 1934: "Stephen Decatur, great nephew of Commodore Stephen Decatur, naval hero of the War of 1812 who subdued the Barbary pirates, died at his home here today after a short illness. He was in his 78th year.

"He was a Navy man like his ancestor, although a boyish prank threatened, despite the name he bore, to bring a quick and officially dishonored end to his naval career. As a midshipman at the naval academy, where he stood in the highest rank of his class, he was expelled for hazing. The act which thus apparently terminated his naval chances was the whitewashing of a negro. Occurring only a few years after the Civil War, it aroused national indignation, and he was dismissed from the academy.

"He returned to Portsmouth, N. H., and then attended M. I. T., graduating in 1876. He retrieved the naval significance of his name when the Spanish War came, obtaining reinstatement in the Navy and serving on the staff of Admiral Schley as a lieutenant.

"After the war he retired to private life, and since then had lived here, taking an active interest in yachting. His wife, who died several years ago, was a descendant of Tobias Lear, Washington's private secretary, and was a granddaughter of Ichabod Goodwin, Civil War Governor of New Hampshire.

"Decatur was the grandson of John Pierce Decatur, brother of the famous 1812 commodore. John Pierce Decatur was at one time a naval officer, but served in the army in the War of 1812. His son, Stephen Decatur, was a commodore in the Navy, and the man who died today was the fourth Stephen Decatur in the Navy. He was christened William Beverly, but when his older brother, Stephen, died at the time he was six years old, his name was legally changed to Stephen.

"He was a member of the Society of Cincinnati of New Hampshire, Sons of the American Revolution, Roosevelt camp, Sons of Veterans, the Federal Fire Society, DeWitt Clinton Knights Templars, and a 32nd degree mason.

"Surviving him are two sons, Stephen Decatur of Garden City, N. Y., and Storer Goodwin Decatur of New York, and a daughter, Mrs. Anna Decatur Wright, of Kittery Point."

We have received the following letter from Henry Hibbard: "As a minor item of news, let me say that I am a 50-year member of both the American Institute of Mining and Metallurgical Engineers, and the American Society of Mechanical Engineers, and have the 50-year badge of each. I believe that I am the only man living who has both of these badges; in fact, I think that I am the only man who ever has had both. I joined the Miners in 1879 and the Mechanicals in 1883.

"I look in each issue of The Technology Review for news of '77, but not always with success, as in the January number just arrived. Last month I made the first nine holes of our golf course here in 39, which was one stroke better than my record of 40 made some ten years ago. On four of the greens I got down with one putt, which explains the low score. With best regards as always." — BELVIN T. WILLISTON, *Secretary*, 3 Monmouth Street, Somerville, Mass.

1886

Word comes to the Secretary from a notice in a Rutland, Vt., paper of the death of George W. Farmer at his home in Chicago last November. After graduation, Farmer went to Iowa, where for several years he was in the employ of the A. T. & S. F. Railroad. Since 1906 his home has been in Chicago, where he developed and managed an extensive real estate business. He was buried in Rutland, Vt., his native city.

A notice in the Boston *Herald* announces the death of Harry B. Merriam at Falmouth Foreside, Maine, on December 21. Immediately after graduation Merriam went West and for many years he was employed in railroad construction and maintenance in Montana and other western states. Upon his retirement he moved to Maine. His widow, two daughters, and a son survive him. — ARTHUR G. ROBBINS, *Secretary*, 12 Grove Street, Winchester.

1888

The husband of John Runkle's oldest daughter, Catharine, Rev. Robert C. Withington, was installed as Minister of the First Parish Unitarian Church in Scituate, Mass., on January 7. A reception for Rev. and Mrs. Withington was held in the Parish Hall at the close of the installation service. This church celebrates its 300th Anniversary this year as it was organized in 1634. Elizabeth, John's second daughter, has returned home after two years at Cambridge University, Cambridge, England, where she received degrees of B.A. and M.A. She has recently been appointed Dean of The Stuart School, Boston. We congratulate John and Mrs. Runkle on their family of distinguished daughters.

Russell Colby died at his home in Aurora, Ill., on November 24, 1933. Death was due to an attack of embolism of the brain which he suffered about a week before while getting into his car to go to lunch. Colby was born in Leominster, Mass., and entered the Institute from that town with our class. After graduation he was Assistant Chemist, Massachusetts State Board of Health, Boston, 1888; Assistant Superintendent, Chicago and Aurora Smelting and Refining Company, Aurora, Ill., 1889–92; superintendent of the same company from 1892–99, when it went out of existence; then he became one of the two founders and President of the Aurora Metal Company, which position he held for 34 years until his death. This concern is known throughout the country as one of the few manufacturers of babbit metals, locomotive piston rod packings, and aluminum bronze die castings. It sells its products to all the leading railroads and its die castings are used in many well-known automobiles. Colby was married to Winifred Bird, November 28, 1895. Only she survives him. He was a director of the Merchants National Bank and director and Treasurer of the Aurora Country Club, and to his wise guidance of the budgetary problems of these two institutions is attributed their strong position through adverse times. Colby was founder of the Community Chest plan in Aurora and director of the Aurora Chapter of the American Red Cross. His hobby was golf and he and Mrs. Colby, even on the most blustery days, could be seen tramping the fairways of the Country Club together. He was revered by the workmen in his employ and always known as a kindly and considerate "boss." Much of the above information in regard to the details of Colby's life was obtained by your Secretary from a local newspaper sent him by Mrs. Colby at his request. Although naturally quiet, Colby was an active leader in the civic affairs of Aurora and his associates there as well as his classmates around Boston will mourn his passing.

We have been notified of the death of William K. Leonard, President of the Piqua Hosiery Company, Piqua, Ohio, on November 26, 1931. Leonard was with us only during our freshman year. In 1915 he replied to an invitation to a class reunion, expressing pleasure at being considered a member of the Class and wishing that it were possible to meet again the members of the Class of '88. This is all we can find in the class records.

Now, as the radio announcer says, "just one more item of news": Sarah, youngest of your Secretary's three daughters, announced her engagement, at a small party on New Year's day, to Mr. John Robb Hughes, of Utica, N. Y. She attended Bradford Academy and Mr. Hughes is a graduate of Hamilton College and Harvard Business School. Future plans are still in embryo. — BERTRAND R. T. COLLINS, *Secretary*, 25 Bennington Street, Newton, Mass.

1890

Cassius M. Foster's home address is now given us as 1929 Scottwood Avenue, Toledo, Ohio.

1890 Continued

Francis P. Sears, who was with us our freshman year and then left and went to Harvard, was one of the incorporators of The Columbian National Life Insurance Company with offices at 77 Franklin Street, Boston. He has recently been made President, following the death of Arthur E. Childs. Mr. Sears has been a director since incorporation of the Company in 1902, and was the first Vice-President and comptroller of the company for a number of years. He is married and lives with his wife and three children, at 83 Mt. Vernon Street. He has a summer home in Hamilton; and is a member of the Country, Harvard, Myopia, and Union Clubs.

On December 6, Pierre S. du Pont, chairman of the board of E. I. du Pont de Nemours and Company and a director of the General Motors Corporation, was elected chairman of the Industrial Advisory Board, succeeding Louis E. Kirstein of Boston.

Leonard C. Wason, President of the Aberthaw Company of Boston, and builder of the new Christian Science Publishing Society building in Boston, was a guest of the A. G. C. at a talk by Dr. Compton with description of NRA Building Codes, December 19, in Walker Memorial.

Charles Hayden appeared in the magazine *Time* recently with an account of how he came to give $150,000 to the planetarium to be built in New York City. Having seen the one in Chicago and been impressed with the infinity of the heavens, he expressed his belief in the planetarium as a step toward relating science and religion. Thus he explains it: "It has been said many times that science has a tendency to make one less religious. With this thought I radically disagree. I do not consider that religion is measured by the number of times a person goes to church. I think true religion is based on the principle that one believes there is a much greater Power in the universe than the human being on earth. . . . I hope that the planetarium when completed will give many people that view of life."

At the annual meeting of the American Society of Civil Engineers this week, the following members of the Class of '90 were in attendance: Fuller, Rice, Walker, and Sherman. The last named began a five-year term as a member of the Executive Committee of the Sanitary Engineering Division, and also was charged with the presentation of the members to whom medals and prizes were awarded by the society for the year 1933. He was designated for this duty by virtue of having been chairman of the committee appointed to examine the papers and recommend those for which awards should be made.

Your Secretary with Mrs. Gilmore and Mrs. H. M. Goodwin plan now to start for Trion, N. C., the latter part of February to be gone through most of March. This leaves Goodwin to look after affairs at Tech in his lady's absence. — GEORGE L. GILMORE, *Secretary*, 57 Hancock Street, Lexington, Mass.

1892

On January 3 the Greater Boston (including Detroit, Bridgewater, Framingham, Hartford, and Worcester) members of the class had a dinner at the Boston City Club. Fourteen came. Falvey showed up at the last minute to get us out of the "13 at dinner" class, and this is the list: Carlson, Charles Chase, Dean, J. W. Hall, Falvey, F. I. Davis, Heywood, Kales, Locke, Norcross, Nutter, Park, Fuller, and Pettee. There were no formalities or speeches, just our usual chatty dinner. The letters that appeared in the January Review were read and commented on. As evidence of how much the party was enjoyed, the Secretary was asked to get the group together again at a suitable time.

In addition to the losses reported in the January Review, the death of Ward M. Sackett, which occurred on November 19, 1932, and Samuel N. Braman on December 5, 1933, were announced.

The following members' mail has been returned unclaimed. If anyone can give any news of these members, it would be appreciated: Charles A. Brigham, Frank Eaton, Jesse F. Johnson, and Herbert L. Wardner. Frank I. Davis is now living at 50 Lewis Street, Hartford, Conn.

And now I know you will enjoy the following letter from Billy Kales, written on December 4: "I was sorry that I did not receive your circular letter asking for class news soon enough to be able to write something for it. Being away off here in Detroit, I so seldom see members of our class that my news must necessarily be almost entirely confined to myself alone. Occasionally I see Horace Preston, who was known as Horace Lobenstene when he was at Tech. I have heard from Fred Harvey several times lately. He has been having the difficulties that most all of the American farmers have been experiencing and is now getting back into his original profession of mining engineer.

"As regards myself, this has been a very hectic year, for I have participated in all of the difficulties that Detroit has experienced. As the automobile center of the country, the depression has been particularly severe with us. Then to make matters worse, came the bank difficulties in which our senior senator took sides against his home town instead of endeavoring to be of assistance. There were times when we hesitated to even purchase a newspaper on account of the necessarily heavy outlay of cash, but we are doing much better now. The investigations which have already taken place before a Grand Jury were remarkable in that everyone who claimed to have any knowledge of guilty practices with the Detroit banking institutions was encouraged to say everything that he knew, and that, when all of the charges had been carefully investigated, no dishonesty or crooked practices were unearthed. On the contrary, all charges of such conduct that were made were proved groundless. We evidently had a banking personnel in Detroit that was much more honest than appears to have been the case in other cities that have been investigated. They made many mistakes, but so did everybody else. It has been hard to see our accumulated savings of years which were invested in bank stocks turn from assets to liabilities. I was sorry to see the muck-raking article which came out in the last number of *Harper's*. I know it will give the country at large the impression that Detroit is inhabited by crooks. From the paragraphs in which it lauds Senator Couzens, we have our suspicions as to its inspiration.

"In May our family passed through a terrible experience due to the kidnapping of my little granddaughter, Peggy McMath, and the nasty article that appeared in the Boston *American* stating that my son-in-law, Neil McMath, had been arrested for the crime, and further stating that it was an 'inside job' planned and carried out by people in the McMath household, the inference, of course, being that Neil had planned a fake kidnapping of his daughter in order that he might extract money from his tight-wad father-in-law and mother-in-law. I need not tell you that no finer fellow breathes than Neil McMath, nor can I tell you how trying it was to our family to find that this frightful story had gone from end to end of our country and been believed by individuals everywhere who did not know us and had no way of knowing the kind of people composing the McMath and Kales families. The line of defense put up for the kidnapper, Kenneth Buck, consisted entirely in an effort to blacken Neil's name. We were glad to see that one kidnapper at least was punished for the frightful crime and sorry that the brother, who was also on trial, was not found guilty, because after listening to every word of the testimony, I think that he was certainly proved guilty of participation in the effort to extort money from Neil through the kidnapping of Peggy. We were extremely fortunate, however, in the outcome, because we got our dear little granddaughter back entirely unharmed and also all of the ransom money. It has taken months, however, to restore the peace of mind of my daughter, Margaret, and her husband. In fact, even now they are not completely over the effects of their ghastly experience.

"Our three oldest children, including my son, Bob, who graduated from Tech in '28, are married, leaving only our youngest, Ellen, who is now a freshman at Vassar. We had a family gathering at Thanksgiving time, and last Friday gave a coming-out reception for Ellen, who came home from college for the week-end." — JOHN W. HALL, *Secretary*, 8 Hillside Street, Roxbury, Mass.

1894

Less than five months remain before the great event of the decade — our Fortieth Anniversary as a graduate class. A letter to each member will shortly be issued. A committee is at work on plans. From the first reactions, it seems probable that our program will be very similar to that of the earlier reunions of five, 10, and 15 years ago, when we had such enjoyable

1894 Continued

outings, with golf tournaments and other sports, strenuous or suitably restrained, on the south shore of Cape Cod. This is not a fixture, however, and will depend somewhat on a preliminary canvass of members of the class. The date for the reunion is also somewhat in abeyance, but it is likely to be either the week-end of June 1–4 or of June 8–11. Members of the class should keep both periods intact awaiting the final action of the committee. Meantime, make it a point to see all the '94 men in your section and talk it over, and send the Secretary your ideas for a good time. We graduated in a depression year and survived the shock. Eventually, we all got jobs, and some of us have them still. The committee realizes we shall sadly miss the fellowship of loyal classmates who have been among our regular attendants in years past. One cannot contemplate our losses without great sorrow, but nevertheless this is going to be a good reunion to attend, for the same spirit of friendship will prevail, and we feel that every man who can get here should be on hand. It ought not to be a difficult decision this 40th year, and so I say with Will Bovey's outfit, "Eventually, why not now?" Scan the mails for a class letter about the time the moon fulls. It didn't seem wise to send it at the end of December for fear it would be mistaken for just another belated Christmas card or a January first bill. These now probably all being out of the way, either paid or lost, the Secretary can take a chance — with hope for a hearty response.

Now for a few notes on some of our members: Walter Piper and his wife have a most hospitable habit of being "at home" to their family connections and intimate friends on Sunday nights. My wife and I were fortunate enough to be introduced into the group recently by Joe Phelan and his family and found great pleasure in so doing. Our only regret was that we had not taken along the younger generation also to join in the activities of this interesting group. Although Piper's business affairs center largely in Andover and Boston, his "lares and penates" are set up on an old farm in Sudbury which he and Mrs. Piper have transformed into a delightful home where one finds genuine hospitality and a charming environment both indoors and out.

Francis C. Green has recently assumed an administrative position in connection with the Philadelphia City Planning Commission in coöperation with work undertaken by the CWA. His wide experience in administrative affairs should make his service of especial value in the work he has undertaken, which has developed some rather unusual types of inquiry.

I understand that Frank McKibben is also giving a part, or all of his time, to engineering projects which are connected with the efforts to bring about business recovery, and spends considerable time in Washington, although still maintaining his home at Black Gap, Fayetteville, Pa.

Nate Cheney, who was recently mentioned in these notes as having forsaken engineering for special service in the life insurance field, sends his home address: 242 Payson Road, Belmont, where he combines business with the joys of suburban life, gardening, and other pleasure-giving pursuits.

While waiting for a train in the Albany Union Station one morning in late December, I encountered Theodore Horton and Mrs. Horton, and had a moment's conversation with them. Horton's work as Chief Sanitary Engineer, Department of Public Works of the State of New York, takes him to various parts of the state, and he was at the moment headed for Long Island.

News has recently been received of the death of Frederick M. Burnham, of 732 Pine Street, Michigan City, Ind. Burnham was connected with the class only during our freshman year, and has maintained only very infrequent contacts, so no details of his life can at present be supplied.

The class will learn with very great regret, of the death of Harry S. Duckworth which occurred on Monday, January 22, after an extended illness. Alan Claflin and the Secretary attended the funeral which was held on the day these notes were written. Duckworth has been for several years Vice-President and General Manager of the Cranston Print Works, Cranston, R. I., but was obliged to give up active work about two years ago owing to illness. In spite of a series of recurring mild shocks, he worked early and late with an unflinching spirit, but was finally unable to carry on further active work. He was one of the best-known and most highly efficient men in his special field. In addition to his deep, practical, and scientific interest in the technology of finishing cotton goods, he had a diversity of hobbies or special interests, in each of which he had more than ordinary knowledge. He read widely and was a great lover of books, and especially of history, biography, and art. He was very fond of flowers and a very successful gardener. He took a real interest in the welfare of his employees, and was generous in all kinds of good works. His whole life since, in fact even before, graduation was spent in his chosen profession of textile chemistry, and he held successively positions of increasing responsibility in Massachusetts, Dover, N. H., Garnerville, N. Y., and for the past 15 years at Cranston. Those who knew him only casually as a student will remember his love of fun and gayety, sense of humor and ease of making friends. Only those who knew him well in later years appreciated the scope of his interests or the depths of sentiment, real culture, and integrity of character which marked and endeared him to his friends. — S. C. PRESCOTT, *Secretary*, M. I. T., Cambridge, Mass.

1895

An interesting article was printed in a December New York *World-Telegram* referring to the class elections at the time of our graduation. "It was February, 1895. A class of 150 embryo engineers was planning the ceremonies amidst which, in June, its members were to receive diplomas, degrees, and congratulations.

"Properly conducted commencements require marshals, orators, and committees. Young Jerry Swope, 22, was candidate for a class committee. As Gerard Swope he was destined to become the most publicized member of the class, but at that time he was just another senior being considered for a temporary position of local honor.

"Jerry Swope decided that if class positions were worth filling at all, the men elected should be the choice of the majority of their mates, and not a mere plurality. So he devised a scheme which he induced the class to try out. After voting for his first choice, each class member was told to name a second choice, and a third, and as many more as he wanted. Any candidate having an absolute majority would be elected. If none had a majority the lowest would be dropped, and his ballots distributed according to second choices. This process was to be continued until all places were filled.

"When they came to count the ballots, nobody knew how. I was a candidate for office but they had to send for me to help count. I put the figures on a big blackboard, so many first choices and so many seconds for each candidate. They said it was another of Swope's fool ideas, but I was elected.

"What Gerard Swope devised is that which is now used, here and there, around the world, as the single transferable vote system of preferential voting. It had been explained by E. J. Nanson, professor of mathematics at Melbourne University 13 years before, and had been used in Queensland for electing legislators since 1892. Young Swope, however, had been busy tearing down and building up electrical apparatus and had never heard of it. As a matter of fact, aside from the Tech Class of 1895, there is no evidence that anybody in this country used it until Grand Junction, Colo., adopted it in 1909, followed for a time by Cleveland, San Francisco, Spokane, and lesser communities." How many of you boys remember the incident?

We learn with great regret from the New York *Herald-Tribune* of the death of Edward F. Smith at the age of 61. Smith was a retired manufacturer and for the last ten years lived in Altadena, Calif. He was born in Shelburne Falls, Mass.; became a draftsman in a tool factory in Greenfield, Mass., and in 1900 purchased the Greenfield Machine Company. This plant he operated until 1921, when he sold it to the Greenfield Tap and Die Corporation. While maintaining a residence in California, he also had a summer home at Mattapoisett, Mass.

Jonny Moore is holding his own while serving on the labor board under Senator Wagner. He settled a strike in Wilkes-Barre, Pa., in the anthracite district; he then went to Bisbee, Ariz., where he concluded a settlement at the Phelps-

1895 Continued

Dodge Plant. We are waiting to hear of his latest experience at the Weirton Steel Plant, in Weirton, W. Va. Jonny has acquired the title of "major" in the Kentucky fashion. Leave it to John!

John Wolfe has gone to Florida to recuperate from his recent illness. — LUTHER K. YODER, *Secretary*, 69 Pleasant Street, Ayer, Mass., JOHN H. GARDINER, *Assistant Secretary*, Graybar Electric Company, 420 Lexington Avenue, New York, N. Y.

1896

Henry Waterman continues to be one of the leading public-spirited citizens of Yarmouth, N. S. In addition to running his farm in the Annapolis Valley, on which is a large orchard, and in front of which is a river for fishing, he is President of the Children's Aid Society of Yarmouth. He was also reëlected President of the Yarmouth Boy Scout Association for the coming year and is apparently the prime mover in this organization. He likewise maintains a strong interest in political affairs, being President of the Yarmouth County Liberal Association and Vice-President of the Nova Scotia Liberal Association. He waged an active political campaign, and undoubtedly the overturn last fall was very materially helped by his efforts, which resulted in a great Liberal victory of 21 seats against only eight seats for the Conservatives and one tied. The Conservatives had been in office since 1925.

The resignation of Dr. Harold S. Boardman, President of the University of Maine, was announced on January 5, the reason given being that of ill health. Boardman was chosen President in 1926 to succeed Dr. Clarence Little. His connection with the school, which will terminate in June, began about 40 years ago, and he received his degree of Bachelor of Civil Engineering in 1895. After spending the next year at Technology, he was a tutor in drawing at Maine from 1896–99, draftsman with the Union Bridge Company at Athens, Pa., 1900–01, instructor in Civil Engineering at Maine 1901–03, Associate Professor and Head of the Department 1903–04, Professor of Civil Engineering 1904–26, and also Dean of the College of Technology 1910–26, acting President 1925–26. Dr. Boardman states that he has made no definite plans for the future, but hopes to be able to rest a year and give his attention to personal matters and to his family during that time.

In an earlier issue was the report that Professor Bradley Stoughton was helping the unemployment by building a new house on the outskirts of Bethlehem, Pa., where he is head of the Metallurgical Department in Lehigh University. This house had been completed, and it is understood was being occupied, when a sad calamity in December caused a total loss by fire.

In the last report of the Treasurer of Technology was an item of $27,400 additional received from the estate of Jim Haste. The Haste Fund for Student Aid began with an initial payment of $141-000, and the total today by additional payments from the Executors, and by accumulated interest, is $176,579.33.

Calvin I. Crocker is running the municipal ferries from New York City as he has been doing for many years, and reports that he gets the usual damning the public provides for all public enterprises. Outside of that his life has been peaceful and, while he is old enough to resign, he still considers that he has many of his younger tastes, and cannot realize that he is 37 years out of Technology.

Further details of the farm which Gene Laws is running is that it comprises 226 acres and was settled in 1768 by James Laws. It is on route 12 about four miles from West Fitchburg, toward Ashburnham, but the house itself is about half a mile off the state road. Visitors, especially '96 men, are always welcome.

A recent letter from Partridge on a letterhead "Rev. W. M. Partridge, Mission Priest, Hollywood, Calif." was actually written from Escondido, Calif., where he said he was staying among the mountains until after Christmas, and then expected to go into Arizona and probably on to Florida. Since he left New York nearly two years ago he has preached to many thousands, has traveled nearly 6,000 miles through 22 states to get to Los Angeles, and has gone some 5,000 miles through Southern California, preaching at different places.

Mark Allen has succeeded in finding a young man who will henceforth assume the responsibility of one of his daughters, as evidenced by the announcement from Mark and his wife of the marriage of their daughter, Sarah, to Mr. John W. Hession, Jr., on Friday, December 29, at Detroit, Mich. The couple are residing in Hastings on Hudson, N. Y.

Misfortune marked the latter part of 1933 for Lou Morse. During a very icy condition he slipped on his steps as he left his house on the morning of December 13. He went the entire length and fractured two ribs, which caused him a lot of pain for the following fortnight or more. He is now back to normal, however. Mrs. Morse had her share as well, very narrowly escaping pneumonia in November. She had a slow period of convalescence, but had reached the point at New Years's where she was able to go out when the weather was favorable, and her improvement was continuing daily.

Word has been received indirectly that Arthur Baldwin has been spending a few weeks in America from his duties in Paris. At the time these notes are being written at the end of January he had not appeared in Boston, and no word had been heard from him directly, but it is probable that he will be back in France by the time this appears in print.

A Christmas letter from John Lonngren reported that he was still plugging away in Los Angeles and that Mrs. Lonngren, who had not been very well since the death of her sister in the fall, was improving.

Brief mention was made in the last issue of the death of Ralph S. Whiting, which occurred in Eau Gallie, Fla., on August 22. He was born in Pittsfield, Mass., his father being one of the founders of the Whiting Paper Mills. After leaving Technology he was associated with Mr. Ring in architecture in Boston, and later with Hodgson Brothers in New York designing and building banks throughout the country. He resigned from Hodgson Brothers to open an architectural office in Cleveland in 1913, and the next year allied himself with the lumber industry as Architectural Engineer with the National Lumbermen's Association, with headquarters in Chicago. In 1920 he moved from Chicago to Seattle, Wash., where he became Secretary and Manager of the Red Cedar Shingle Bureau, holding this position until ill health forced him to resign August 1, 1930. During that period of ten years he had labored untiringly in the interests of the Red Cedar shingle manufacturers, and had made many friends in all branches of the lumber industry. After his resignation he and Mrs. Whiting located in Eau Gallie, Fla., with the hope that the climate would benefit him. For three years prior to his death he battled against great odds to overcome the heart trouble he had developed from overwork and untiring efforts to make the Bureau a success, never losing his sense of humor and his geniality, which had endeared him to all his associates. The end came rather suddenly. He had been in fairly good health up to August 19, when he had a slight stroke, and gradually lapsed into a coma from which he never awakened. Ralph married Samantha M. Immler of Akron, Ohio, in 1913. He is survived by his widow, one sister, Mrs. William Sargeant of Yonkers, N. Y., and a niece, Mrs. Jefferson Place of Chicago. Mrs. Whiting writes that in spite of his affliction Ralph's last three years in the beautiful Indian River country of Florida which he loved were most happy ones for him and for her.

In addition to his business he had a keen interest in military affairs, being at one time Captain in the Massachusetts State cavalry, serving in Cuba during the Spanish American War, and consulting architectural engineer for building cantonments during the World War. He was a member of the Sons of the American Revolution. At Technology he belonged to the Sigma Tau Chapter of the Delta Kappa Epsilon fraternity. Later he became a member of the Hamilton Club of Chicago, and the Hoo-Hoo Club, a lumbermen's organization, and belonged to the Scottish Rite Illinois Commandery No. 72 and the Knight Templars. — CHARLES E. LOCKE, *Secretary*, Room 8–109, M. I. T., Cambridge, Mass. JOHN A. ROCKWELL, *Assistant Secretary*, 24 Garden Street, Cambridge, Mass.

1898

Charlie Hurter sends interesting news of himself, A. W. Tucker, and Earle Emery's brother, writing from St. Petersburg, Fla., Apt. 14, 512 Dartmoor Street N.: "We came down from Cape Cod in November without going to Boston. On the way down I spent a couple of very

1898 Continued

pleasant days with A. W. Tucker at Raleigh, N. C. He has made a very successful business manager for St. Mary's School for Girls. He showed us all over Raleigh.

"On Friday we had a very pleasant visit with Lew Emery at his winter home in Tarpon Springs about 40 miles from here. He has an ideal place for a winter residence. — We have not planned any extensive trip this year as we saw a lot of Florida last year. My principal diversion has been playing shuffleboard."

We have just received a new address for Julius Nolte: Kennedy Warren Apartments, 3133 Connecticut Avenue, N. W., Washington, D. C. — We have word of the death of Edward F. Morrill on September 2. Morrill has for years been with the Ohio Bell Telephone Company. Although he has not appeared in Boston for many years, he has always kept up a warm interest in our class and we could always count on an appreciative answer to any notice concerning class activities. He leaves a wife and three children. — ARTHUR A. BLANCHARD, *Secretary*, Room 4-160, M. I. T., Cambridge, Mass.

1900

Stanley Fitch presided at the meeting of the Boston Chapter of the National Association of Cost Accountants and the Associated Industries of Massachusetts, held December 13. From the sketches in the newspapers next day our handsome Class President would hardly be recognized.

Batcheller from Corvallis writes as follows: "The word 'Secretary' immediately following your signature below your appeal for personal information from M. I. T. 1900 members awakened a sympathetic response within me — for you deserve support since an almost insuperable combination of both lack of *funds* and lack of *time* will prevent me from attending your get-together dinner December 20. I will send this line of Season's Greetings to you all. The enclosed family Christmas card, made from a linoleum print carved by one of my clever-fingered sons, will show you what we can see from our place here on the edge of town. The card was not big enough to include still another perpetual snow clad peak, Mt. Jefferson, to the east in the Cascade Range, between Hood on the north and the Three Sisters to the south, all three 11,000 feet more or less. Christinimi is in the coast range to the west. Corvallis (the 'Heart of the Valley') is only 220 feet above sea level, with a marvelous climate. We have had only two frosts this fall. I have roses still blooming in my yard and violets, marigolds, and so on. On Sunday, the 10th, I picked the last of my ever-bearing (La France variety) red raspberries, which we have been enjoying all the fall, and they were delicious. This Willamette River Valley has a climate like the traditional 'Vale of Kashmere.' (Pronounce it *not* as the French would, but as though spelled Wilaumet — to rhyme with Cataumet or Wenaumet.) I see by the papers you poor devils are shivering at 12° F. You know years ago when Boston was a little town, some citizen appealed to the Honorable Board of Selectmen to do something to ameliorate the bitterness of the chill winds that blew around the spot now known as Park Street Church Corner. Some devout student of the Bible, on the basis of the Scriptures (so I am told) quoted this passage 'The Lord tempers the wind to the shorn lamb' and moved that the Selectmen keep a shorn lamb tethered at that point!!!! It seems to me you need a few thousands of lambs in this especial condition picketed all over New England! Try it and let me know how it works! In the meantime I prefer the Pacific N. W. both winter *and* summer.

"Kind regards to you all. After my youngest boy gets through high school (he has two more years yet), I shall try to attend M. I. T. 1900 gatherings at least once in a while. Since 1930 I have another son in College, one just leaving to try to get into professional dramatics, and the oldest finishing his last year at the U. S. Naval Academy at Annapolis. No other family news. No business news save that I have been appointed to Secretaryship of the new Oregon State Mining Board, with headquarters still here in the Mining Department of the State College.

"Good luck and best wishes to you always."

Word has been received from E. A. Hopwood of the death on December 11 of Cora S. Hopwood, VIII, of 11 Oberlin Street, Worcester. — The sympathy of the Class is extended to Henry B. Bigelow whose daughter, Elizabeth, died January 14 in Concord. — C. BURTON COTTING, *Secretary*, 111 Devonshire Street, Boston, Mass.

1901

As those of you who read my yearly communication realize full well, I have been endeavoring for lo these many years to secure "good addresses" — this has nothing to do with the Social Register — for all of those who at one time or another were enrolled in the Class of 1901. Occasionally I find myself happily striking off one name from the list of the lost — though I trust not damned. The latest of the missing, with whom contact has been reëstablished, is Russell H. Glover, yclept "Rusty" to his intimates. For the moment he is to be found in Astoria, L. I. I refrain from giving the complete address in recognition of the reticence that he has demonstrated for the past 33 years, but with his permission I will furnish the street and number to those who make inquiry. He also tells me that he spends a long summer in the home of himself and his forebears. Again I refrain from a more specific designation, for I concede a respect for his wish and though I may myself parallel the privacy of the domesticated gold fish — the guppy is small enough to keep his intimate personal affairs to himself even though he live in an aquarium — it is not always a matter of volition. There is a Mrs. Rusty who just falls within the three-year limit and thus permits mention in these columns. He writes that he is not closely in touch with our own group, Stan Sears having been the only one in recent years, and Stan is now among the missing. In my letter to him I suggested modestly that I lived in Boston and that sight of him would be welcome but he firmly dispels any pleasant illusions that I might cherish by stating that his route is through Worcester, Lowell, and Haverhill. Worcester I can concede, but why Lowell and Haverhill? Here's hoping he hits the Boston road sometime and that I am within call.

Some time ago Charlie Bittinger shook the somewhat tenacious dust of Boston from his well-varnished shoes and hied him to Washington, where he plays games as a gifted amateur with the Bureau of Standards people. Quite recently in a column-long article from one of the Philadelphia papers I learned of a new activity added to the protean group which has already attracted his attention. Charlie has always been interested in light, from that aspect of it which is metaphorically associated with sweetness to that which surprises the Christian while he sings. The intermediate stadia between these antipodes are varied and colorful and old-fashioned inhibitions prevent my touching too closely on some of them. Well, Charlie is giving a course of lectures at the Franklin Institute, named after Ben of that patronymic who, if history sayeth sooth, had also been about a bit. Charlie is now taking pictures in the dark and I understand is besieged by all of the private detective agencies in the United States. Think of the vista of possibilities opened wide by this pleasing approach. The article in question was embellished by a staff picture of Charlie and a friend which was obviously posed for the occasion and thus blameless and a little dull. It's a good likeness though, even though the version be boulderized and illustrates how far social applications may be made of this latest wonder of science.

Speaking of color, one of Charlie's pals has reduced all color to three simple units by subtracting everything else from them, and, with these three simple colors in just and proper proportions, it is possible to reproduce the entire spectral gamut. I understand that Charlie is working on an aspect of this in which the general principle is to be applied to cosmetics. I hope that Bill LeBosquet chances on this fact as it may prolong his peripatetic career. Charlie showed the simple folk of Philadelphia how a painting of a United States battleship seen in one light becomes the United States flag in another. This patriotic and popular touch is pleasantly apposite in view of the present navy bill which, however, will undoubtedly be killed before these lines come to press in order that the money may be transmuted into a more elastic medium. But anyhow Charlie is doing his bit in the general scheme of transformation which is now intriguing the government in Washing-

1901 Continued

ton. The principal difference, however, is that Charlie can get back his first picture by going back to his original lighting, a reversible reaction that does not seem to be applicable to our present noble financial experiment. The parallel, however, which engenders a faint ray of hope, lies in the fact that Charlie also takes away almost everything from very little to get his results. The topic is one upon which I could philosophize, but away with bitterness. Thank God I have no grandchildren. — ALLAN W. ROWE, *Secretary*, 4 Newbury Street, Boston, Mass.

1902

Thayer Gates died suddenly on the evening of New Year's Day in Richmond, Va. He had been in poor health for several months and had had two previous attacks of angina pectoris. From the second attack, which came near the end of November, he had but just recovered sufficiently to return to his work as superintendent of the Finishing Department of the Riverside and Dan River Mills in Danville, Va. On New Year's Day he went to Richmond, accompanied by his wife and a business associate, as he had an appointment for a medical examination the next day. In the evening the party attended the theater and during the performance Gates suffered another heart attack and died before he could be taken to a hospital.

The funeral and burial were at Lowell, Mass., which was Gates' family home. Mrs. Gates and their daughter, Mrs. Alley, were escorted by the President and other officers of the company on their trip from Richmond to Lowell. Gates was born in Lowell and prepared for Technology at Phillips Andover Academy. He pursued the Course in Mechanical Engineering and was an active and popular classmate, serving as Vice-President of the Class one year. He was a member of Sigma Chi fraternity.

Textile manufacturing has been Gates' work ever since his years at the Institute. He started as an assistant to the supervising engineer of the American Woolen Company and was then master mechanic of the Wilkes-Barre Lace Manufacturing Company and next was factory manager of the Brighton Mills at Passaic, N. J. For a term of years he was connected with the Sayles Bleacheries at Saylesville, R. I., as superintendent of the Glenlyon Dye Works and then as industrial engineer reorganizing the Sayles Mills along the lines of scientific management, and also was in charge of power and construction. In 1918 Gates went to Manayunk, Pa., where he was with the Collins and Aikman Company, manufacturers of plushes.

In 1919 Gates opened an office in Providence, R. I., as a consulting engineer and textile specialist, where he conducted an active practice till he moved his headquarters to New York in 1930. Early in 1932 he removed to Danville, Va., to take up the position that he held up to the time of his death.

The Danville paper says of Gates: "Mr. Gates came to Danville a year and a half ago to take over the Finishing Department and to apply new maxims of efficiency which have proved very beneficial to the mills. He was highly rated among textile officials all over the country and had devoted all his life to the textile business."

Gates was married in 1904 to Cecilia Lovell, who survives him. Their only daughter, Marjorie Lovell Gates, was married only a few weeks before her father's death to Anthony W. Alley of Danville. — Thayer Gates was one of the most loyal members of the class and few, if any, of his classmates got more enjoyment from the class gatherings. During the famous Twenty-Five Year Reunion of the class seven years ago, the Secretary found Gates in the room where various memorabilia of the class were displayed, slowly turning the pages of the Class Portfolio. "Hunter," he said, "my copy of this book was lost years ago when my house burned down and you don't know how much I miss it." Happily the Class Secretary was able to secure a copy for him through the kindness of Mrs. Bernard W. Capen, who had preserved her late husband's book. Mrs. Capen's pleasure in placing the book in the hands of some one who would prize it and Gates' real delight in having once more the Portfolio with the pictures of his classmates are among the pleasantest memories of the Secretary. — FREDERICK H. HUNTER, *Secretary*, Box 11, West Roxbury, Mass. BURTON G. PHILBRICK, *Assistant Secretary*, 246 Stuart Street, Boston, Mass.

1904

During the latter part of November, 1933, I had the very unusual experience of receiving a letter from a classmate, and, being of a generous nature, I am about to share it with the rest of you. Under date of November 19, 1933, A. D., Smith wrote me the following letter on the stationery of the Park Lane Hotel, London: "Just a line or two to tell you I landed at Liverpool October 30, am still in London, and likely to be so a couple of weeks more before I start for the Continent.

"It is the same old London — friendly and distant, cheery and drear, ever modernizing and yet never changing. Every time I come over some modern structure has given place to some outworn building, two or three more mammoth escalators have displaced a corresponding number of the old "lifts" of the underground railways; but the open country with its ever-green grass, the really fine old edifices, the hazy sun, the fog, and the open-grate fires are here to stay in spite of electric traffic signals and electric heating in the ultra modern apartments.

"While it is good to be back, I shall certainly miss Thanksgiving at home, and to a born New Englander that day means much. However, I've passed so many Fourths of July, Thanksgiving Days, and so on, out of the States that I ought to be rather used to it, for I think with the possible exception of Selskar Gunn, I come pretty near to holding the class record for foreign travel. I think I told you I crossed once to be gone two months and that it took me six years to return, but I hope it won't be so bad this time, as I only have Paris, Schaffhausen (Switzerland), Berlin, and Bucuresti in view, and hoping to get back for Christmas at that.

"Everything here, with the possible exception of British shipping, is on the up-turn. Coal has risen in price. Export trade has steadily moved up and unemployment has been correspondingly reduced. I have a half-formed idea that the ancient formula of self-denial, saving, and hard work (I'm afraid outgrown in the States) is responsible. I don't like the idea though of $5.50 to the pound, and understand it is much worse proportionately in France. I wonder how it will all end.

"Have run on much further than I intended, so will close wishing you a pleasant Thanksgiving and a Merry Christmas to come." I appreciate very much the receipt of this letter and hope for more in the future from other classmates.

Ros Davis, Secretary of 1905, sent me an extract from a letter received by him from John Flynn, one of his classmates. ". . . Recently I had a very pleasant visit from another 'old timer' of about our class; namely, William Perry Bentley, who came up from Dallas, Texas, to talk about an asphalt plant. Bentley is, of course, President of the Uvalde Construction Company and we are both extremely interested in the developments in the use of asphaltic type plant mix pavement by the Texas State Highway Department. They have just let their first large job down there; namely, resurfacing the highway from Dallas to Fort Worth with 'hot mix' which will be used to cover the old worn and broken brick and concrete pavement, and to widen the highway out to 40 feet. Bentley made a splendid attempt to win this big job, but failed to land it by one-half of one per cent. He, of course, has other work and undoubtedly will get lots more, but it did seem too bad that he should miss this first big job (it ran nearly half a million dollars) by such a narrow margin."

It often happens that I receive interesting items regarding our classmates from sources outside of our class and they all help to fill up our notes.

Recent newspaper items have mentioned the adoption of a centrifugal machine gun by the Japanese Army and the Boston *American* of December 27, 1933, contained an article which proclaimed that the United States is not much concerned about it inasmuch as the centrifugal machine gun is nothing new in this country. The article goes on to state that a centrifugal machine gun was invented by Levi W. Lombard of Sharon, Mass., which was tested by the U. S. Army in 1918. The interesting part to us of this story is the fact that "Volts" Ovington assisted Mr. Lombard in his work on the

1904 Continued

gun and the article contains a picture of "Volts" demonstrating how the gun was operated. This only goes to show the versatility of our classmate. I, for one, had little suspected him of being concerned in the invention and manufacture of lethal weapons.

I received recently from the Alumni Office notification of change of address of Selskar Gunn. According to this notification he has gone from Paris, France, to Hamilton House, Shanghai, China. I have no further information with reference to why he has gone to China but assume that he is still interested in the health of the world in general and that his presence there will be of great benefit to that locality.

The sympathy of the Class goes out to Harry Kendall over the death of his youngest son, Donald, who, with a chum, was drowned on December 1, 1933, in Naukeag Lake, Ashburnham, Mass., when a small sailboat was overturned in a high wind and both boys lost their lives.

It becomes my sad duty to record the death of two more of our classmates: Dick Hartshorne died on September 26, 1933, after a brief illness. Dick was born in Wakefield, Mass., on July 2, 1881, and had lived there all his life. For many years he had been connected with the New England Structural Steel Company in the capacity of engineer and was well known throughout the structural steel industry in New England. He leaves a wife and one son, Richard, Jr. We shall all miss Dick at the future reunions, where he was a familiar figure and one of the Class's best golfers. — Lee Phillips died at Lakeland, Fla., August 18, 1932, according to a notice received from his daughter.

If present plans are carried out the Thirtieth Reunion of the Class will be held at East Bay Lodge, Osterville, on June 22, 23, and 24, 1934. Further particulars will be issued later as at the time these notes are written no definite arrangements have been made. — HENRY W. STEVENS, *Secretary*, 12 Garrison Street, Chestnut Hill, Mass. AMASA M. HOLCOMBE, *Assistant Secretary*, 3305 18th Street, N. W., Washington, D. C.

1905

The following was left out of Harry Wentworth's, VIII, letter last month: "I have made a rule (so far, at least) to have the boys work two-thirds or three-quarters of each summer and play or rest the balance. In this program the oldest boy spent one summer underground in Canadian mines, one at school and bicycling over France, one as a newspaper reporter, one as swimming instructor, one as lobster fisherman in part and in part before the mast on a freighter to South American ports (before he landed his job after graduation). The summer he was 20 and his brother 16, I wanted them to be together, so I suggested they visit some 12 big industrial units over the country (including coal, copper, and gold mines, smelters, chemical plants, oil refineries, automobile plants, and so on), and they made a 10,500-mile trip in a Ford, stopping two weeks with friends, three nights at hotels, and the balance mostly in a pup tent. They took in, incidentally, the Virginian Caves, the bull fights of Juarez, the Grand Canyon, Agua Caliente, the entire Pacific Coast to Portland, Butte, Yellowstone National Park, and so on. Total cost, exclusive of first cost of car, but including gas, oil, tires, food, hotels, and every expense — $349.91. Elapsed time, 56 days. Merely shows what a couple of youngsters can get out of a summer if they are willing to economize. They drank a great deal of milk, ate very little meat, but lived largely on jelly, peanut butter, and other similar sandwiches."

Claude Anderson, XIII, says: "Ammen, XIII, is still here practicing patent law but haven't seen him for some months. C. A. Emerson, XI, now makes his headquarters in New York, I understand, since his company, Fuller and McClintock, closed the Philadelphia office, but learn he frequently gets here although I have not seen him.

"It is true that I went into the Johnson Fan and Blower Company of Chicago as Vice-President co-incident with the '29 crash and have since learned that Uranus was in juxtaposition with Saturn, or something or other, at the time and that caused all our trouble. The Johnson Company passed out of the picture in 1932 but thanks to my always having kept friendly with competitors, I stepped right into the Clarage Fan Company of Kalamazoo, Mich., as district manager here. The Clarage Company is rated as one of the "Big 4" in the industry and has done some fine work in air conditioning and the many lines requiring air handling. It is very progressive, but most of its men are from Cornell.

"The public speaking I went into is an interesting sideline and has taught me the incomparable art of keeping one's mouth shut when there is nothing to say. I still play the trumpet some and am getting a real kick out of singing in and managing a good church chorus. You may recall my weakness for the N. E. Conservatory of Music during the halcyon days of youth.

"The son graduated from Penn. State last year and will make out well. The daughter who finished at Simmons has now married and lives in West Newton within two miles of where she was born."

From Grove Marcy, II: "Had a surprise today in the way of a phone talk with Bill Spalding, who was in Maynard for a day or two on a job at the American Powder Company, which I gather is a subsidiary of his concern. Said he had been out in California for a couple of months at another plant. Took his whole family and did some camping out in the desert. This explains a Christmas card I had from him showing his tribe doing ring-a-rosy around one of the big trees out there. Expects to be sent down to Alabama next, so you might get a travelog out of him.

"I went up to the farm in New Hampshire with three of my kids between Christmas and New Year's, and let them race me around on skis. They couldn't lose me, however, though I fell down every way there is, and went down every hill they led me to. It was 29° below, and noses got nipped, but we kept comfortable and had a great time.

"We have closed up our Direct Mail Division, and Charlie Hawkes, II, is with The Foxboro Company, doing sales development work.

"I had luck with my apples this year. Sent them to Hamburg on two days' notice, and got advantage of the 60-cent dollar. The export house said they netted the highest of any they handled this year. It was just in time for taxes. (What have you to say about apples, Bob Lord, X? Sec. '05.)

"Bill Green spent an evening with me shortly before Christmas. Same Old Bill, and wasn't it good to see him. Hub I see frequently, and Harry Wentworth now and then. Bob McLean, Charlie Boggs, and until lately John Damon, and I dignify the Council meetings by our presence."

Bill Spalding, III, will speak for himself: "I'm still with the American Cyanamid Company at 535 Fifth Avenue, New York. Your letter reached me in the middle of the Mohave Desert, to which I have been commuting this year. The Company is interested in a chemical deposit in the bottom of one of the 'dry' lakes of that region and I have been out there a couple of times to investigate it and to install and start up a pilot plant. This last time I left October 5 with my whole family — five of us — and drove out over the Santa Fe trail. We had a wonderful trip of it and saw enough scenery to keep us happy for a long time. We went down into the Grand Canyon on mule-back, spent a night in Yosemite Valley, were driven down in the contractor's car into the lower workings of the Boulder Dam, picked up arrowheads and cliff-dwellers' pottery at Montezuma's Castle in Arizona, crossed the Mexican border at Tia Juana, and missed the Carlsbad Caverns by only a hundred miles.

"I left my family for two months at a small outpost of civilization in the desert, 25 miles from my camp, over a fair desert road. The younger children found a school there of which they highly approved (no homework) but Bill, Jr., who is a senior in High, had to go 80 miles to Redlands, returning by bus on week-ends. My wife found housekeeping simple and pleasant in a two-room shack; we all got very healthy in the glorious sunshine and learned to love the desert life!

"We got home December 26, traveling the southern route in perfect weather until the last day when we plunked down into a blinding blizzard followed by sub-zero weather. Give me another 10 years and then visit us on our orange ranch in sunny Southern California!"

And here is Hallett Robbins, III, one time globe-circling engineer for the same American Cyanamid Company, writing from Glendale, Calif.: "My own situation is just about the same as when I wrote you last. To a certain extent I am

1905 Continued

retired and devoting myself to the enjoyment of the many delightful aspects of life in Southern California, but I am also doing a little metallurgical consulting work and some purchasing of mine equipment and supplies."

Ed Burkhardt's, XIII, son, Roger, a senior at Wesleyan, decided to play host to a germ and spent Christmas Day in the Middletown hospital. Father and mother drove down for the day but it was not a very lively Christmas for the boy, who went home to Brookline a few days later to recuperate.

Percy Goodale, VI, writes: "I am still sticking to the job of managing the Preferred Accident Insurance Company (65 Kilby Street, Boston) in this section and now have two of my sons in the office with me."

And Arthur Lord, I, of the insurance agency of Dwight C. Lord and Son, Providence, says: "I still maintain an active interest in my Fraternity, and in this way keep in touch with the Institute. I am always glad to meet any Technology men and especially those whom I knew while I attended the Institute. I have driven through Middletown two or three times on my way to New Haven but have always been in a rush to get there and have not had an opportunity of looking you up." See that? It's the way it goes. Half the class has doubtless driven through our city — and kept-a-going.

From Edward C. Smith, V: "Our boy, Edward, is now in his sophomore year at Oberlin and is enjoying life there very much. He is going to major in chemistry.

"Last summer the whole family visited Middlefield, Mass., and attended the Sesquicentennial of the town. I had the privilege of giving the historical address just as my father did 50 years ago at the Centennial celebration in 1883. My brother wrote and directed the presentation of a pageant showing some scenes in the history of the town. We had good attendance in spite of the rain on August 19. The weather was more propitious on Sunday when the pageant was finally given. Family reunions and meetings with old friends made it a great occasion for us all." You may recall that, a few years ago, Ed wrote a history of the Town of Middlefield which was reviewed by your Secretary.

George Jones, II, wrote awhile back: "I attended a lecture in the Illinois building by my client, C. E. Johansson of Detroit, whose gauge block business is a branch of the Ford Company, who demonstrated his various gauges, and while a lecture of that character is not particularly hilarious, some of the assemblage of blocks aroused sufficient enthusiasm to evoke spontaneous applause. This is 'going some' for a collection of metal blocks, even though they are made to a millionth of an inch more or less."

Francis F. Longley, XI, 11 Courter Avenue, Maplewood, N. J., wrote last March: "I have to stretch the truth pretty hard to claim membership in the Class of 1905 or in any other class in M. I. T., and, sad as it may seem, I cannot name a half dozen members of that class, nor would I know more than that number if I met them. I was not, in truth, a member of any class at the Institute, but was a special student for a period during the year of 1903–1904. At that time, to tell the truth, I did not know that I was classified with any class, but for want of more precise information, I supposed I was classified as a special student. Under these circumstances you can understand that my acquaintances in the Class of 1905 were few, and it so happens that my affairs during the years since 1904 have not resulted in my keeping in touch with even those few, not even, I regret to say, with good old Sid Strickland, who was one of those I thought of as a warm friend during my brief stay at Tech.

"I know that an answer is due you for your letters have been not only dutiful but also doggone friendly, considering the fact that in reality you do not know me from Adam's off ox, but nevertheless I appreciate it and I'll tell you what I'll do. Some day when I am driving up in the neighborhood of Middletown I will drop in on you and try to add one loyal and dutiful member of 1905 to my unfortunately very slender list of acquaintances in that class."

That letter should be read, for it shows what has been done by one on whom we have almost no claim. But Longley, a graduate of West Point, had been consulting civil and sanitary engineer for the League of Red Cross Societies in Geneva and with the Ministry of Health, Australia, and it looked as though the fishing might be good. The letter is appreciated by your Secretary who, however, has not received the promised visit in the ten months since the letter was written.

From Henry Keith, XIII: "Shipbuilding is picking up a little these days, and we hope that by summer there will be considerably more activity. Most of the work is now in the planning stage, but by spring there should be some actual ships on the way. Course XIII is quite active for these times and so we have plenty to do in this Department, which, of course, is very fortunate. I see our classmates Cowdrey, II, Lewis, X, and Lyon, VI, once in a while and, as usual, they are very busy during the winter.

"The Mechanical Engineering Department has lost three of its professors within a short time: Hayward, Miller and R. H. Smith, all of whom you know very well, and such losses as these remind us that time is passing." — ROSWELL DAVIS, *Secretary*, Wesleyan Station, Middletown, Conn. SIDNEY T. STRICKLAND, *Assistant Secretary*, 20 Newbury Street, Boston, Mass.

1906

When the Secretary received a reminder on January 6 that notes for the March issue would be due January 24 he wondered what could be done to help out the column, as not a single news item was available at that time. Imagine his joy upon receiving the following from Ralph Patch: "Just received the announcement of the Home-Coming Dinner. To save you time and effort in trying to find out whether I shall join the 1906 bunch for any part of the festivities I will write before I forget it that I shall be away during February. That is the time when I take my vacation. Mrs. Patch and I are going, as usual, to Altamonte Springs, Fla. We drove down last year for the first time, having used the train until then. We enjoyed driving so shall go that way again this year. I have to be back for the first Monday in March, as I am still moderator of the town meeting. Spring seems not too near right now, but it will be here before we know it. Let's make a date soon for a time when one or two foursomes of 1906 men will get out for a game together." The town referred to in Ralph's letter is Stoneham, Mass., which I know has seen three generations of the Patch family and I cannot say how many more. Incidentally, those of us who commute through the North Station in Boston may have noticed on exhibition, during the latter part of January, a very pleasing little model of a section of the beach at Scituate, showing the moss gatherers collecting sea moss for Ralph's famous "Nepto-Lotion," which is one of the present products of the E. L. Patch Company, also located in Stoneham. The author can sincerely recommend "Nepto-Lotion" as being good for chapped hands, and so on, but in spite of the efficacy of the product, we do not blame him for spending the month of February in a climate where "Nepto-Lotion" is not necessary.

The Boston *Transcript* of January 22 contained a clipping with regard to the high costs of conducting Massachusetts cities. This was based upon a report of the cost of local government in Massachusetts made by T. L. Hinckley, XI, former Director of the Division of Municipal and Industrial Research at M. I. T., submitted to the New England Council, and made public by that organization. The report points out that Massachusetts cities have an unnecessarily large complement of public employees, the ratio of the municipal personnel to population in this state being about 20% higher than in the States of Rhode Island, Connecticut, New York, New Jersey, and Pennsylvania, taken as a unit. Quoting further from the report: Noting that the abnormal conditions of the past three years, when the loss of a public job has in many cases meant an addition to the welfare list, have doubtless prevented the discharge of superfluous personnel, such considerations should not blind the public to the necessity of placing local government on a more efficient basis in respect to personnel. The report suggests that, until normal conditions return, communities withhold new appointments, distributing the work of employees who leave the service among those who remain. The compilation of a complete code of State laws affecting municipalities was suggested in the report as a measure which would probably reveal many opportunities for simplification and improvement in State laws

1906 Continued

which are at present believed to be adversely affecting the general level of municipal costs.

Carroll A. Farwell, I, who is a member of the firm of Fay, Spofford and Thorndike, consulting engineers, was one of the speakers at the meeting of the Boston Society of Civil Engineers devoted to a discussion of the Cape Cod Canal and the new high-level bridges. Those of us who are familiar with Cape Cod probably know that plans are under way to build two new highway bridges over the Canal at Sagamore and Buzzards Bay, the site of the present bridges. Fay, Spofford and Thorndike are consulting engineers for the job. Perhaps our route to the scene of the 1936 reunion will take us over one of said bridges.

Course II men will be interested to know that Walter B. Clifford is Treasurer of the Clifford Manufacturing Company, operating a factory in South Boston. It is understood he has developed a gas tube thermostat for the control of electric refrigeration that has kept him busy in spite of Old Man Depression. He makes his home at 21 Lime Street, which is in the Beacon Hill section of Boston. — J. W. KIDDER, *Secretary*, Room 1001, 50 Oliver Street, Boston, Mass. EDWARD B. ROWE, *Assistant Secretary*, 11 Cushing Road, Wellesley Hills, Mass.

1907

We have items of news regarding only two members of our class for this issue, though we have looked through the entire card file of our fellows to see if some other facts might suggest themselves.

Through the courtesy of Professor Locke, we are able to report that Howard J. C. MacDonald, mining consultant to the U. S. S. R., on completion of five years of service in Russia on May 1, was commended by A. P. Serebvovski, Assistant People's Commissar of Heavy Industry, in the following words: "He has done much in the first Five-Year plan; in the Second he will do more, and we hope he will be with us for many more five-year plans. No man has aided us so much, and I personally will ask the government to accord him the high honor which in my opinion is so well merited by him."

From the (Butte) Montana *Standard* of January 18 is taken the following news item regarding the son of Fred Jaccard. Your Secretary has written a note of sympathy in behalf of the class. "Fred Constance Jaccard, 23, a son of Mr. and Mrs. F. C. Jaccard, 1201 West Steele Street, died yesterday at Chicago following a week's illness, it was learned in a message from his father who was with his son when he died. News of the death was received with much regret, particularly at the Butte high school, where the youth was a popular student and member of the Butte High football team during his sophomore, junior, and senior years. He graduated in 1928. Among his friends he was known as Connie.

"He was born in Kansas City, Mo., and moved with his parents to Butte while a small boy. He received both his elementary and high school education here, after which he spent one year at Montana University at Missoula. He then attended the State University of Washington at Seattle for three years. Last fall he entered the Coyne Electrical School at Chicago and had recently completed his course.

"The boy was an exceptional football player and was prominent in athletics generally. He was an all-state tackle while with Butte High.

"In addition to his parents, he is survived by the following brothers and sisters, all of Butte: James, Eugenie, Helen, Leslie, Hiel, and Gilbert."

And the Montana *Standard* of January 6 contains this item: "Carl J. Trauerman, President of the Montana Stock and Bond Company, received notice from the Gold Miners' Association of America that he had been appointed a member of the board of directors of the association. There are 11 states in the organization. Each state has two members on the board of directors. Mr. Trauerman's associate is Harry C. Bacorn, Vice-President and general manager of the Jardine Mining Company. The headquarters of the association are in San Francisco." — BRYANT NICHOLS, *Secretary*, 12 Newland Street, Auburndale, Mass. HAROLD S. WONSON, *Assistant Secretary*, Commonwealth Shoe and Leather Company, Whitman, Mass.

1908

Harry P. Sweeny, who since his return from Africa has been living in East Orange, N. J., left in November for a temporary job of about six months on some mining work in Guatemala. However, he is still retaining his East Orange address, where his family will continue to reside.

We were sorry to learn of the death several months ago of George H. Pierce, who had been valuation engineer for the Chicago Rapid Transit Company practically since his graduation from Technology. He is survived by his wife and two sons.

William D. Milne, who has been in charge of the New England division of the Eastern Underwriters Inspection Bureau for some time, was recently made Assistant Manager of that Bureau with headquarters in New York.

We have the following changes of addresses to report: Langdon Coffin, 150 Church Street, Newton, Mass.; Samuel H. Daddow, 401 South Second Street, St. Clair, Pa.; John T. Ellsworth, 501 Canyon Road, Ogden, Utah; Herbert C. Elton, 1188 Main Street, Bridgeport, Conn.; Paul E. Fernald, 1316 Speedway, Tucson, Ariz.; John Gianella, 228 Marlboro Road, Brooklyn, N. Y.; Louis S. Gordon, 393 Seventh Avenue, Room 1514, New York City; Ernest E. Kilburn, R. F. D. #3, Wilmington, Del.; Frank E. Ludington, 186 Watertown Avenue, Waterbury, Conn.; George M. J. Mackay, American Cyanamid Company, 535 Fifth Avenue, New York City; Rens E. Schirmer, 54 Sagamore Road, Bronxville, N. Y.; Leavitt W. Thurlow, P. O. Box 476, Indio, Calif. — HAROLD L. CARTER, *Secretary*, 185 Franklin Street, Boston, Mass.

1909

1909–1934. Make your plans now to attend our Twenty-Fifth Reunion next June!

The Reunion Committee would welcome suggestions, both as to time and place for holding the reunion or what can be done to make the reunion more enjoyable. — CHARLES R. MAIN, *Secretary*, 201 Devonshire Street, Boston, Mass. PAUL M. WISWALL, *Assistant Secretary*, General Foods Corporation, 250 Park Avenue, New York, N. Y. MAURICE R. SCHARFF, *Assistant Secretary*, Main and Company, 1 Wall Street, New York, N. Y.

1910

The grist of news is pretty small this month. Your Secretary regrets this very much, but if the letters don't come in, they don't, so it's up to you.

Don Williamson writes a very appreciative letter congratulating the Secretary on the class news. He says he rarely sees a classmate and would be glad to hear from any when passing through Chicago. He is President of the Williamson Glue Works. — Johnnie Ruckmann is still worrying over his class gift. He writes: "The class officially expressed its interest in my affairs at graduation. I shall continue to respect their wishes."

Your Secretary saw a couple of classmates last week when he went to the local meeting of the American Chemical Society with Dick Fernandez to hear John Bierer speak. Bierer gave an interesting talk on rubber. I ran into Herb Cleverdon at the Auto Show. He said that he was not there to buy a Rolls but he looks pretty prosperous just the same. He has had Charlie Greene doing some engineering work for him and has managed to keep pretty busy with his architectural engineering work, mostly building breweries. — DUDLEY CLAPP, *Secretary*, 40 Water Street, East Cambridge, Mass.

1911

Here is a letter such as delights the cockles of a Class Secretary's heart and entitles the sender, in this case, Carl Richmond, I, to membership in the "Friends of Class Secretaries":

"Glad to have a card from you and learn that you noted what my Christmas card announced — a son. Few did. Time was when we looked forward to the 'Class Baby' — then marriages of 1911 men became real news — then marriages and babies came along pretty regularly and they were less startling as news — they were the normal events to keep your column full. Now births are slackening up (because few are blowing over grandchildren, although I guess there are a few).

"My 'John Q.', born on December 5, a half hour after prohibition was repealed, narrowly escaped being named 'John Barleycorn' in commemoration of the day but the strenuous objections of his grandmother made it John Q. instead of the almost John B.

1911 Continued

"John Q. says (by proxy) that he is M.I.T. 1955 — this after reading K. T. C.'s letter of December 27. Now I wonder when and where we are to have — not the 'Class Baby' (that was really a cinch!) — but the 'Last Class Baby'. As Mrs. Richmond is still in her twenties it doesn't look so bad in Quincy. If we have a youngster in M.I.T. 1970, will you lead the cheering at graduation? You're elected!!"

There's a challenge in that last paragraph, mates. Rich's reference to grandchildren also suggests that we should have a list to publish of present 1911 grandchildren. Please obey that impulse, you who have grandchildren, and write to Dennie!

Just as 1933 drew to a close, a returned letter revealed the fact that William B. Ives, VI, died in Denver, Colo., on February 1, 1933. Ives was forced to leave school before graduation due to ill health and went to Denver in an effort to regain it.

Here are a couple of items concerning the 1911 colony in Akron, Ohio. Harry Alexander, I, is back with Goodyear after being for a time with Seiberling. Another tire engineer, Karl Kilborn, II, is at present in France doing some special work for Seiberling. — We had lost track of Charlie Magrath, II, but have recently learned he is at 681 Garland Avenue, Winnetka, Ill.

It certainly is pleasing the way Technology men visiting New York are coming here to the St. Moritz-on-the-Park, where I am, but classmates apparently must be backward about addressing letters to me here, judging by their scarcity. More letters mean better class notes. — ORVILLE B. DENISON, *Secretary*, Hotel St. Moritz, 50 Central Park South, New York, N. Y. JOHN A. HERLIHY, *Assistant Secretary*, 588 Riverside Avenue, Medford, Mass.

1912

It certainly is a pleasure these days to meet a classmate who is reasonably cheerful about business. Joseph I. Murray, VII, paid us a very welcome visit, allowed us to show him the McGraw-Hill Building, and then told us that his organization sold lots more of its product in 1933 than 1932, and hoped to do better still in 1934. What product is that, you ask? Well, it's ice cream! Joe is General Manager of the Eskimo Pie Corporation of New York, and operates their Brooklyn plant, which produced and sold in the New York Metropolitan area alone, 800,000 dozen more Eskimo Pies last year than the preceding year. Laugh that off, if you want to. We didn't try to. Instead, we introduced Joe to the editor of our publication, *Food Industries*, which is intensely interested in getting stories about people and organizations who can do a job like this in the face of depression conditions.

Murray has had many varied and interesting experiences since he left school. His story was covered in these columns some two or three years ago. Suffice it to repeat here, that when Eskimo Pies first came out he took part in a distribution enterprise in Winnipeg, Canada, and made some money before cut-throat competition spoiled the fun. He got back again in the production end of the business with the New York Corporation about two years ago. He lives at St. Albans, L. I., is married, and has one daughter.

From Murray we got a lead with which we located our old friend H. W. (Herb) Hall, VI, in Westfield, Mass. We'll let him speak for himself: "I expect to come to New York sometime within a week or ten days," says Hall, "and will look you up and we can have a good visit together. Joe Murray gave you roughly the correct picture of my activities of late. I had my own brokerage firm in Detroit with a seat on the Stock Exchange and in addition was on the boards of several corporations.

"As you know, I got knocked about quite a bit over in France and had to spend considerable time in hospitals since the War and my health started to slip in 1931. So, I sold out most of my interests in Detroit with the exception of one or two directorates at that time, including the brokerage business, and have been spending most of my time on my dairy farm here at Westfield, where I fool with pure bred Holsteins and kindred subjects. I have been doing a little hunting and fishing and taking trips about the country renewing old acquaintanceships since I left Detroit.

"Last summer I did a little job for Joe Murray, who is manager of the New York Eskimo Pie Corporation, by acting as New England distributor for their ice cream products. I will give you all the details when I see you in New York." Hall's address is P. O. Box 305, Westfield, Mass.

Through the courtesy of "Dennie" (O. B. Denison '11) we have had a bit of news about Harold R. Fox, III, from whom he has just received a letter seeking information about a member of the Class of 1911. Fox is still in Kingston, Jamaica, British West Indies, where he is chief engineer for the Jamaica Government Railroad. Fox reports that they were not hit very hard by the depression until last year. Then, besides the depression, they got a series of floods and storms to add to their troubles. However, they feel they are working their way out of it and while business conditions are pretty bad, he says the people are not in actual want. Fox is married and has four children, the oldest of whom is 17 years of age. — F. J. SHEPARD, JR., *Secretary*, 125 Walnut Street, Watertown, Mass. D. J. MCGRATH, *Assistant Secretary*, McGraw-Hill Publishing Company, Inc., 330 West 42nd Street, New York, N. Y.

1914

Reunion plans have occupied the foreground of our activities during the recent weeks. Following President Dorrance's visit to Boston in December, he appointed Charlie Fiske as General Chairman. Then came a rapid flow of letters organizing the committee, making preliminary plans, and finally a sub-committee dinner meeting at the Tech Club of New York, on January 25, at which meeting there were present: Fiske, Fox, Owen, Ober, Ross Dickson, Perley, and Richmond. The *Fourteen Pointer* was brought back into being, and Charlie Fox again agreed to be editor-in-chief. Because this little publication of our own will contain the reunion news, we will not impose on the editors of The Technology Review for further space to describe reunion plans.

While in New York your Secretary had a pleasant visit with Sousa Brooks. Sousa is trying to locate enough members of his old band to put on a serenade at the reunion. Now that repeal is here, there should be no cramping of style of "that little German band."

One of the features of the Mid-Winter Convention of the American Institute of Electrical Engineers was a symposium on Auditory Perspective. Two of our classmates presented papers dealing with this fascinating subject. E. C. Wente discussed loud speaker and microphone requirements for such a system, while H. A. Affel discussed transmission characteristics of telephone lines capable of transmitting the wide frequency bands necessary for auditory perspective. At this same convention C. A. Corney discussed a paper on "An Economic System for Suburban Distribution of Electrical Energy."

Our President's modesty apparently prevents him from sending to your Secretary news items of his own fame. The sharp eyes of other '14 men occasionally glean from the press Buck's achievements, the latest reported being from the New York *Times*. It reads: "Arthur C. Dorrance, President of the Campbell Soup Company, has been elected a trustee of the Pennsylvania Mutual Life Insurance Company, succeeding the late John Bancroft."

Vital statistics have been so meager that when an item appears it deserves special prominence. Donald Dixon announces the arrival on January 20 of James Goodhue Dixon. This balances Dixon's family, making it two boys and two girls. Donald has one of the Federal alphabet jobs at Bourne, Mass., largely in connection with the three new bridges to be built across the Cape Cod Canal. He is officially manager of the United States Reëmployment Service and reports that his project already has 400 men at work.

Art Peaslee visited Boston recently to study building conditions. He reported that he was just recovering from a broken toe obtained, not on one of his own construction jobs, but by the inelegant method of kicking a chair. Likewise Peb Stone has just recovered from a foot bruise. Peb has, however, a real excuse. He was about to sell a lathe and became so excited at the improvement in business that he tipped the lathe over on his foot. Peb and Art have both started training for the rigors of the June reunion.

Another '14 man who has returned to his office after an illness is Jimmy Judge of Holyoke, Mass. Jim found it necessary to give up his regular activities for about a month because of a severe case of grippe.

1914 Continued

Some members of the class are still solvent. One day recently Dean Fales, Charlie Fiske, and Walter Keith were seen eating — and not all in one group either — at the Waldorf Astoria. And less than a month later Dean was back in New York looking over cabin cruisers at the Motor Boat Show.

Sousa Brooks complained to your Secretary that too much publicity was being given in these notes to the patents constantly being issued to Affel. So for variety's sake we take pleasure in announcing that Phil Currier of Schenectady drew the lucky number, and the title of his new patent is "A Thermostatic Control for Vapor-Electric Devices."

Chet Gardner writes from Brooklyn that he is still at the Brooklyn Navy Yard, although he has not seen many classmates recently. Perhaps between Joe Currier and Gardner we may be able to get a Navy ship to take the New York contingent to our June reunion.

Harold V. V. Fay has been appointed "special expert" in the International Relations Section of the Tariff Commission at Washington. Fay writes that he is finding his work, which is primarily research, intensely interesting in these days of rapidly changing conditions.

Still in Washington and as a fire protection engineer, but with a new department, is genial and energetic Frank Ahern. His position was discontinued with the general and unfortunate cut at the Bureau of Standards so he transferred to the Department of the Interior, Office of National Parks, Buildings, and Reservations Section.

Just because they would be old and out-of-date by the time this is published, the kaleidoscopic activities of Porter Adams have been left until last. By placing a report of them here they will at least be nearest the next issue. Pat came down from Vermont at Christmas time when Dean Fales and your Secretary did their best to bestow upon him congratulations in the manner that the Class would have wished, for now, besides being a member of the Vermont Legislature and actively engaged in a host of other projects, Pat is none other than President of Norwich University. His new duties were to have started January 2, but just on the last day of the old year, word came to Pat that his house at Thetford, Vt., had burned to the ground without saving a thing. A lifetime collection of souvenirs, personal autographs from the Nation's great, a beautiful first editions' library, and all personal effects were lost. Only one who has been at the house can appreciate the full significance of the loss. Porter started at once for Vermont in that biting bit of sub-zero weather that visited New England as the year ended — and on the way up contracted pneumonia. For days he lay seriously ill at Hanover, N. H., but by the fortitude he has so often shown, he gained the strength for recovery and is now dividing his time between Norwich University and executive in charge of the construction of a system of airports for the state of Vermont to be built under the CWA — HAROLD B. RICHMOND, *Secretary*, 30 Swan Road, Winchester, Mass. GEORGE K. PERLEY, *Assistant Secretary*, 21 Vista Way, Port Washington, N. Y.

1916

Our good classmate, Jack Burbank, was kind enough to send me the following high-lights on a luncheon which was recently held in New York, on Friday, January 12. The following were in attendance: Tom Holden, H. F. Dodge, Bailey Townsend, R. Burnett, Laurence Delabarre, Dick Ahearn, and Jack Burbank. A beaf-steak supper is to be held early in the spring at the Technology Club. The various classmates reported as follows:

Laurence Delabarre is still with the Gorham Company and is making money for South American countries; as a matter of fact, literally minting it. — *Tom Holden* is active with the Mayor's Advisory Committee and with CWA work in New York. In the latter capacity he is not raking leaves in the park. During the summer he lives at Darien, Conn., and spends his spare time in raising eggplant. Tom, of course, is never seen without his pipe and has not yet regained his girlish figure.

H. F. Dodge is with the Bell Laboratories in the Inspection Engineering Department and is in charge of quality standards and inspection methods. This includes such things as techniques for evaluating quality of finished products entering the Telephone plant, or in other words, seeing that the customer gets what he wants. He reports that he is the town poster artist and is a member of the town planning board at Mountain Lakes, N. J. He has a boy eight years old and two girls, six and two. — *Ralph Burnett* is with the RCA Radiostron Company and is doing commercial engineering. He prepares and sends out technical information on tubes, making him both an author and editor. His hobby is cabinet work. — *Bailey Townsend* is running things at Manville, N. J., in the research division of the Johns-Manville Company.

In addition to those who attended the luncheon, Jack Burbank also reports the following news items: *Horace Bickford* is preparing scientific data for the 16 new 1,500-ton destroyers, working out of an office in down-town Manhattan. — *E. A. Ekdahl* has been back from Shanghai for over a year. He is now at the Institute and has a wife and boy, age 2. He is at the present time juggling figures on some sort of actuarial survey for the State of Massachusetts. — *Maurice E. Strieby* is now located at 175 Sagamore Road, Maplewood, N. J. After serving in the Signal Corps during the War, he joined the A. T. & T. in 1919 and went to the Bell Laboratories in 1929. He is conducting researches leading toward multiplication of the telephone and telegraph messages that can be sent out simultaneously over one pair of wires without fighting each other. He has a daughter 12 years and a son seven years old. Plays both ping-pong and bridge when not working or sleeping.

Fred McKown now lives at 260 Robin Road, Englewood, N. J. He is with the A. T. & T. working on the development of local transmission apparatus and equipment — evaluation of how good the quality of transmission is in actual service, the effect of disturbing factors such as noise, distortion, and side tone. He is married and has a daughter nine years and a daughter seven years old. His hobby is amateur photography. — *Leonard Stone* now lives at 35-80th Street, Jackson Heights, L. I. He is also with A. T. & T. and is engaged in the development of office management routine, techniques, or what have you in the staff capacity, for consumption of the operating telephone companies. He says it is a long way from mechanical engineering. He has a boy ten years and a girl eight years. Claims he has too many hobbies, which vary from time to time in ascendancy. Considers himself a potential consultant on Contract but has collected no fees as yet. — *Earl Mellon* now lives at 393 Wyoming Avenue, Maplewood, N. J. He is Treasurer of Western Electric Instrument Company in Newark. He has four sons, ranging from 11 years to four years. He believes that what this country needs is more and better measurements. — *Ralph Mills* is at 463 West Street, New York City, and is with the Bell Telephone Laboratories in charge of development of filters for carrier communication systems. His hobby is camping and roughing it out in any old woods and training his boy and two girls to be good little Indians when eating thick beef steak and onions around an open fire. — HENRY B. SHEPARD, *Secretary*, 269 Highland Street, West Newton, Mass. CHARLES W. LOOMIS, *Assistant Secretary*, Bemis Bro. Bag Company, Memphis, Tenn.

1917

Ted Barnard was kind enough to send a copy of "Field Notes," a publication of the Northwestern Mutual Life Insurance Company, Milwaukee, Wis., and on page 6, we find this interesting item: "P. N. Cristal was appointed a Junior Officer in the Bond Department, November 13, 1933, assuming his new position at that time. Mr. Cristal was born at Bowling Green, Ky., October 12, 1894. He was graduated from Ogden College with an A. B. degree in 1913. He then attended M. I. T., receiving an S. B. degree in Civil Engineering in 1917. After serving in the Army until 1920, Mr. Cristal joined the Van Sweringen organization in Cleveland, serving them in an administrative and financial capacity in connection with their railroad investments. This work familiarized him with railroad operation and financing, equipping him to serve the Northwestern through assisting in the supervision of its railroad bond holdings." A recent letter from Phil indicated that his address has been changed to 2510 East Lake Bluff Drive, Shorewood, Milwaukee, Wis.

Good old "Potts" Mehaffey writes from the Benedick (for bachelors!), 1808 Eye Street, Washington, D. C., approx-

1917 Continued

imately and in part as follows: "Please note that while I am living at present at Bachelors Quarters I am very much married and treasure the memory of receiving that elaborate token (of I don't know what) which I received at Marblehead from the hands of Bill Eddy. At present my official position is Engineer Examiner in the Engineering Division of the Public Works Administration and I find a good many Tech men as associates, I am glad to say. So far I have not discovered any '17 men in our division but presume I will before long, huh! Seriously, the work is very interesting, good experience, and I am quite enthusiastic about it. If you see any of the crew, tell them to be sure and drop in to see me either here or at my office in the Interior Building, if, perchance, they happen to be in this vicinity."

Kenneth Mortimer Lane, after a brief period as a consulting aeronautical engineer, during which he engaged as an expert in several important litigation activities, has become established as third in the engineering line in the Chance-Vought Company, one of the United Aircraft group at Hartford. Ken still continues his athletic activities and very recently strained his Achilles tendon so that he is, for the time being, more reasonable in his athletic pursuits; which reminds me that in the *Saturday Evening Post* not long ago, a story of experiences with Lindbergh included a reference to Lindy's automobile ride to Ken's house during a visit to the Wright plant and prior to the big hop. It seems that the automobile tracks in the front lawn were intentionally left for many moons as souvenirs of Lindy's visit. You may recall that Ken was the engineer responsible for informing Lindbergh of the intricacies of the engine that was such an important part of the "We" combination.

H. E. Hawes is responsible for a large part of the sales of the National Process Company in New York. Possibly others may have shared the impression that this was a little unit operating a special process something like a fancy multigraph. If so, the impression is quickly dispelled by a peek in the door of Hawes' plant. Special printing machines, costing $30,000 apiece and upward, an elaborate photographic unit, including a camera with a plate 3 feet x 5 feet (probably the largest in regular use in the world), and a wide variety of other special facilities are kept producing in part at least by Hawes' efforts, and in printing such items as window displays, road maps of the various oil companies, magazine inserts, and magazine covers.

Farther down town in New York in the seductively sumptuous second story suite of the City Company of New York, Augustus P. (formerly Gus) Farnsworth presides over an important portion of the Industrial Department of the company. He has changed little in appearance from the days when he played football and generally was anything but a dignified bank executive, supposed to know everything about engineering matters and companies engaged in such diversified activities as oil, paper, silk, and so on. The various standard sources of statistics are not fast enough for him so that his office force operates a clipping bureau, clipping and pasting news hot from the press that is noted and held until the summaries arrive. Mr. and Mrs. Gus live with their girl and boy and a dog at Old Greenwich, which brings him in to New England and at least once a year he travels back to Hyde Park. His work gives him enough travel to relieve him of the monotony of daily commuting and in fact, there have been times when he was away on industrial investigations much of the time. He reports that Dick Whitney dropped in a year or so ago, Bob Marlowe gets in occasionally, and one or two other '17 men have been seen.

Congratulations to Harrison P. Eddy, Jr., on the election of his father and partner, Harrison P. Eddy, to the Presidency of the American Society of Civil Engineers. — RAYMOND STEVENS, *Secretary*, 30 Charles River Road, Cambridge, Mass.

1918

Just too late for the February notes by not more that the sealing of an envelope came news of the Gothamites via our ever-willing and reliable Malcolm Eales. Pens he: "Fifteen gallant knights of the old trousers galloped to the Harvard Club for a 1918 dinner on November 20 for the first get-together of this winter. Present were: Russ Mumford (a month in arriving but very welcome), Al Vought, Pete Sanger, Charlie Gray, Charlie Taverner, Jack Kennard, Van Van Zelm, Grannie Smith, C. Chrisholm Fuller, Sax Fletcher, Tom Brosnahan, Asher Joslin, Ev Rowe, Sid Judson, and ye humble self. After fighting the war over during an excellent dinner, bridge and more fighting the war over war were indulged in.

"By means of a little dirty politics and against the better judgment of those present, the Right Honorable Fuller and the Honorable Robertson were elected new local secretary and assistant secretary. 'Glorious and honorable opportunity' is what Pete and I told 'em, but we didn't really use the right adjectives (or are they expletives?)."

During the mid-year lull, your scrivener hopes to make his semi-annual inspection of the New York classmates. This time Mal assures him that there is water in the battery and air in the tires and he will not have to walk more than half way to the Bloomfield station.

The Chinese situation is becoming increasingly complicated. No word of the true meaning of that occult and esoteric chirography on the flyer of the returned Chang envelope has yet come from the secret recesses of the embassy. Now, by the grandfathers of the yellow dragon, comes another on a letter mailed last June 26 to Kwei L. Hsueh and but now returned unclaimed from Wusin Kiangsu, China. Ho hum, why did we start all this anyway? — F. ALEXANDER MAGOUN, *Secretary*, Room 4-136, M. I. T., Cambridge, Mass. GRETCHEN A. PALMER, *Assistant Secretary*, The Thomas School, The Wilson Road, Rowayton, Conn.

1921

Close on the heels of last month's announcement, Professor C. E. Locke sends us another bulletin, dated December 28, 1933, and reading: "The Department of Forestry and Geological Development of the State of Georgia announces the appointment by Governor Eugene Talmadge of Richard W. Smith as State Geologist of Georgia to succeed the late S. W. McCallie. Mr. Smith is a graduate of the M. I. T. and has a master's degree from Cornell. He served as Assistant Geologist on the Tennessee Geological Survey from 1921 to 1925 and has been Assistant State Geologist of Georgia since 1926." Dick has written quite a number of papers on his varied surveys and researches. He and Mrs. Smith make their home in Atlanta.

From the New York *Herald-Tribune* under a Canton, N. Y., date line: "Dr. Robert Dale Ford, who recently retired as head of the mathematics department at St. Lawrence University after 50 years of service, has been replaced by Dr. Oscar K. Bates, a graduate of M. I. T. Dr. Bates, following his graduation from Technology, taught there for 12 years. During this time he was doing research work in the field of thermal conductivity of liquids. He expects to continue these experiments at St. Lawrence this winter."

Miss Miriam Louise Fitzgerald, daughter of Mr. and Mrs. William T. A. Fitzgerald of 43 Ivy Street, Back Bay, was married on December 27, 1933, to Herbert William Reinhard, son of Mr. and Mrs. Frank A. Reinhard of Newton. The bride is a graduate of the Girl's Latin School and Boston University. Following a reception at the Copley-Plaza, the couple left on a western automobile trip. They will reside in Cleveland, Ohio. Herb has been known to be active in sales engineering in the pulp and paper industry when he isn't composing new ditties on that $50,000 Strad! In behalf of the Class, Bill Howard, and the M. I. T. and Tech Show Orchestras — congratulations and best wishes!

Willard G. Loesch is chairman of the Cleveland regional committee which awards the Alumni Regional Scholarships for that district. — H. Seymour Colton is Secretary of the Technology Club of Cleveland. Babe's address is 3105 Keswick Road, Shaker Heights, Ohio. — Robert S. Cook was on the staff of the Department of Works and Concessions at Chicago's "A Century of Progress."

Dear Class: Please write. All is forgiven! — RAYMOND A. ST. LAURENT, *Secretary*, Rogers Paper Manufacturing Company, South Manchester, Conn. CAROLE A. CLARKE, *Assistant Secretary*, 10 University Avenue, Chatham, N. J.

1923

You can thank Pete Pennypacker for the items this month. He reports that the 1923 New York Club held a meeting at the Technology Club of New York on

1923 Continued

December 18 and elected the following officers for this year: Miles Pennypacker, President; Johnny Sands, Vice-President; Rod Goetchius, Secretary; Charlie Mapes, Treasurer. A contract bridge tournament was held the same evening in which Johnny Sands and Charlie Mapes carried off the honors. A dinner dance with the classes of '24 and '25 is scheduled for February, but unfortunately these notes have to be written too far in advance to give adequate notice of detailed plans for the event.

Pete further reports that he had a recent visit from Jose Bertino from Argentina. He studied naval architecture at the Institute in the Class of 1923 and is now affiliated with the Argentina naval establishment. He is trying to organize a local Technology Club in Buenos Aires. — HORATIO L. BOND, *Secretary*, 195 Elm Street, Braintree, Mass. JAMES A. PENNYPACKER, *Assistant Secretary*, Room 661, 11 Broadway, New York, N. Y.

1924

How would any of you like the job of collecting $4,500,000. No? Well, that is Frank Barrett's job at the moment. Of course, he has 10,000 or more people helping him, but that makes the job no less stupendous. Frank, whose regular job is advertising manager of the New England Telephone and Telegraph Company, is executive manager of the emergency campaign in Boston to raise that sum of money for more than 100 charitable institutions. And just because Frank is running the show, we know it is assured of success.

Always having our reunion in mind, I am wondering if we can use his collecting capabilities in connection with that reunion. There is no question that our greatest need is going to be to show the various members of this class how to finance their own part in the reunion. We refuse to admit distance or time as any reason for missing our get-together. So after that campaign is over, you can all expect Frank to start in working a contribution out of you unless you have already made up your mind to go — and have sent Greg Shea the registration fee. How about that registration fee? It is now March and our plans must soon be getting into full swing.

In January there were many missing places in the registration line-up. Do not delay further but send in your registration so a place may be reserved for you at the banquet table. — Ted Simonton has just recently been made a member of the firm of Hoguet and Neary, patent attorneys of New York. And forthwith he was made resident partner and manager of their Syracuse office. His address is 506 State Tower Building, Syracuse.

The classes of 1923, 1924, and 1925 held their fifth annual dinner dance at the Fraternity Clubs Building in New York City on Saturday evening, February 3. Anatole Gruehr and Charlie Mapes were in charge. At this writing I can give no further information except perhaps, in view of the reports on previous events, it is safe to say it was a successful one. — HAROLD G. DONOVAN, *General Secretary*, 372 West Preston Street, Hartford, Conn. ELMER W. BRUGMANN, *Assistant Secretary*, Room 2–131, M. I. T., Cambridge, Mass.

COURSE II

Since the last call for notes from The Review, two letters have filtered through the barriers. The first, from Myron Freeman, gives the information that he was married in 1928 and has a daughter, Janet, aged three and one-half years. Since leaving school he has been engaged in power plant work and allied subjects — both design and construction. Myron was with Jackson and Moreland from 1924–1932, during which time he worked on power plants in Massachusetts, Texas, and Nova Scotia. In 1932 he became a member of the firm of Arthur L. Nelson, engineers in Boston. Myron has just completed the engineering work on a 7,500 kilowatt unit for the Taunton Municipal Lighting Plant. He must be one of those engineers we all dreamed about being.

Ed Hanley, our Assistant Secretary, has been heard from. He is playing a defensive game with his letter, because I threatened him with promotion to the position of Secretary for our Course. You birds better be careful or some of you may wake up some morning and find yourself the Secretary. Ed is in the general accounting department of the General Electric Company at Schenectady. He says: "Tossing debits and credits around in a terrifying fashion." I judge that he tosses them in the right direction, from the prices we have to pay them for special parts.

I do not wish to let this opportunity pass without letting the world know that Mr. and Mrs. Hungerford are the parents of a baby girl, born January 15.

Have you made arrangements for the reunion? — FRED S. HUNGERFORD, *Secretary*, 208 Draper Avenue, Solvay, N. Y.

1925

The following bit of news has come to us via the Boston *Transcript* of December 1: "Miss Dorothy Orlov, daughter of Mr. and Mrs. George Orlov of Roxbury, was married yesterday to Samuel Glaser of Brookline. A small reception followed at the bride's Waumbeck Street Home. Mrs. Glaser is a graduate of Boston University and Mr. Glaser of the Massachusetts Institute of Technology."

Here are a few facts deduced from changes of address: Chink Drew is now located in Detroit, Mich. His business is not stated, but if he still throws the hammer, we recommend that the inhabitants of the automobile city keep their eyes open as they walk the streets. — Dr. Jane M. Dewey is now connected with Bryn Mawr College at Bryn Mawr, Pa. Gerry Milot is living at 3988–49th Street, Long Island City, New York. Members of Course V living in that section will no doubt take advantage of this information to call or telephone him. Incidentally, the Assistant Secretary would be glad to receive a letter from him, as a note sent to his previous address was returned marked "unknown." Gerald Lambert has transferred to Tulsa, Okla., where he is working for the Shell Petroleum Company.

Professor E. W. Brugmann forwards a letter from D. J. McGrath telling of the death of a classmate, which I give in part: "George Brick, XV, died at his home, 132 Amory Street, Brookline, on the evening of December 18. A high blood pressure condition, which had been troubling him for some months, grew steadily worse, and after a brave fight, he finally succumbed.

"In the fall of 1929 I engaged him as an advertising writer and contact man for the Boston office of the McGraw-Hill Publishing Company. There was something that appealed to both myself and our Boston District Manager in his modest approach and an evidence of sincerity and honesty which surrounded both his written and personal application.

"His ability in industrial advertising work was conspicuous. Everybody who was associated with him in our Boston office had the deepest affection for him. He served his company well and faithfully and we will find it hard to fill his place. To me, his death comes as a severe personal loss. I admired him not only for his fine, clean character, but also for his modest faithfulness to the religion and customs of his people.

"George is survived by his wife, Florence, who nearly broke her own health caring for him and trying to help him in his last illness, and also by his mother, a brother, and a sister." This letter speaks for itself, and nothing we could add would serve to honor his memory more fittingly. — HOLLIS WARE, *Acting Secretary*, 16 Smith Avenue, Reading, Mass. Henry V. Cunningham, *Secretary*, Boston, Mass.

1926

Bill Graves is back in Boston for the winter since it is impossible for him to do much prospecting in Canada with snow on the ground. He reports that Bill Forrester was injured in an automobile accident sometime ago, but is coming out of it all right. — Temporarily abandoning his lieges, the Zapotec Indians of Mexico, Ariel F. Horle recently turned his attention to another type of aborigine by lecturing to the student chapter at Technology of the American Institute of Mining Engineers on "The Young Mining Engineer." We recall a stage direction in Shakespeare's "Tempest" which reads: "Enter Ariel, like a water nymph." The young mining engineers here at the Institute missed a good slogan for their posters. — Harry (Spark Plug) Boardman is at 348 South Piper Street, Detroit, Mich., and is now Treasurer of the Detroit Technology Association.

Nuptial Notes: Caroline Fowler's engagement to George W. Breck has been announced. From Nashua, N. H., comes the announcement of the engagement of Charles Rich to Miss Mona Conner. Rufus S. Wilson, Jr., of Newton

1926 Continued

Center, is engaged to Miss Ada P. Folwell, of Montclair, N. J. Walter E. Campbell is engaged to Miss Loraine Leeson of Peoria, Ill. — J. RHYNE KILLIAN, JR., *General Secretary*, Room 11-203, M. I. T., Cambridge, Mass.

1927

The Class of 1927 is back in the class notes after an extended absence — an absence that has provoked the criticism of a large number of the class. A little farther on we shall make some suggestions for the continuance of this column and request your coöperation. The news which we have gathered and listed below may be obsolete in a great many cases — some of it may be fabricated — but it is something, and it will be up to you to bring us up to date.

Our noble President, Jim Lyles, writes from New York that he is still with Chase Harris Forbes and lives at 949 Palmer Avenue, Bronxville, N. Y. Jim gave Boston the honor of a visit about two years ago, but we have been unable to get him back again. I must report that his red moustache still flourishes and that he still has a weakness for campaign cigars. Jim reports the marriage of Ralph Johnson on January 17 in Honolulu to Anna Karen Cooke. Ralph is superintendent of Ewa Plantation, located on the Island of Oahu, 15 to 20 miles from Honolulu.

George Houston is part of the David Houston Corporation, real estate magnates in Newark. George, wife, and daughter are living in Maplewood, N. J. We expect to hear from George in the next issue in his capacity as Secretary of Course XV. The last we saw of Deke Crandall was about a year or two ago and he seemed well on the way to admission to the Fat Men's Club. We understand his prosperity is at least partly due to his own construction firm in Westchester County, New York, where he specializes in small buildings and residences, and the report comes that he has even had an offer from Chic Sayles. Deke is married and lives at Dobbs Ferry.

Warren Smith is still with the Koppers Products Company in Pittsburgh, where he has become a super-specialist in cost accounting work. Being connected with the same firm, your scribbler sees bits of his handiwork occasionally and hears comments on his code numbers "de luxe", which he insists be used in his system. As far as we know, Smitty is not married, in spite of the many expressed opinions that "it wouldn't be long."

I note that Mr. and Mrs. E. H. Clarke of Beechmont, Mass., have announced the engagement of their daughter, Louise Frances, to George P. Standley. Miss Clarke was graduated from Boston University in 1931. George is living at 269 Wardman Road, Kenmore, N. Y., where he has been functioning as a research chemist for du Pont Rayon Company in Buffalo, since his completion of Ph.D. work at the Institute. — Stuart Bugbee passed around the cigars about a year ago to celebrate the birth of Stuart, Jr. Stuart is working for du Pont at Belle, West Va., in its ammonia department.

I am pleased to note that we have at least one politician in our class; namely, Tom Hegarty, who has been made Vice-Chairman of the School Committee of Somerville, Mass. As this information comes from a newspaper clipping, we have no further data regarding Tom. — I am in possession of a letterhead of the Inventors Foundation, Inc. — a non-profit organization to give practical guidance to inventors — on which is prominently displayed the name of Alf Berle. Alf was connected with Stevens Institute last year doing similar work, which is now being handled by Inventors Foundation, Inc. — Maurice Davier is office manager for the Johns-Manville Research Corporation at Manville, N. J. Maurice was married last year.

Some months ago Carl Davies dropped in to see me during a trip to Boston, but, unfortunately, found me absent. However, I understand that he is now the proud father of a baby girl and is still living in Charlestown, S. C., and still in the lumber business. — Glenn Jackson is in Providence, doing industrial research work for one of the finishing companies. I saw Glenn last spring and at that time he had been in Providence but a short time, after having left the David Houston Corporation in New Jersey. I was pleased to have a chance meeting with Maury James last summer when he was on from Milwaukee for a vacation in Boston. He is still with Bucyrus Erie, where he has been since 1927. He has further bettered himself by taking a wife and, when I saw him, his elation in becoming a father last spring had not entirely subsided.

Sullivan Machine Company of St. Louis has recently moved Al Nevers from Davenport to the Detroit area, and I understand that Tom Russell has been married and has moved from Montreal to the Philadelphia division of Sullivan Machine Company. — Bob Wise is still the "man-about-town" and I must confess a chance meeting at one of our more select Boston "dives" some months ago. Bob is still making ice cream for the National Ice Cream Company. — Dike Arnold is part of the Arnold-Copeland Company, 222 Summer Street, Boston. This company is putting an atomizer on the market for the drug trade and it looks as though they had a pretty good item. Dike passed around the cigars last July in honor of the advent of his son, Douglas James. — Ralph Stober is with Simplex Wire and Cable Company in Cambridge, where he is superintendent of the weather-proof wire division. Ralph is married and lives in Newton, and last March joined that ever-increasing list of '27 daddies.

Soapy Woodbury is back at Annisquam after having helped to build the Post Office at Manchester, N. H. I understand he is now making Cape Ann safe from the ravages of the sea by working on the reconstruction of a sea wall at Gloucester. Danny Metzger is selling for the Grinnell Company in Chicago. Previously Danny, with Bruce Sherrill, was working for Grinnell in Providence and living on Audubon Road, Boston. They were commuters extraordinary, driving back and forth to Providence daily. We hear that Bruce has a cabin or a "shanty" on the banks of the Potomac with Brig Allen '29. Bruce is selling for Grinnell in Washington. — Bill Berkeley is working for the Equitable Life Insurance Company in Boston and we note that he helped coach the Tech hockey team during the absence of their coach. — Johnny Drisko is with the U. S. Reclamation Service, Denver. You no doubt have seen Johnny's picture in The Review standing by his model of the Cape Cod Canal studying the flow and the resulting channel changes.

It is with the greatest of pleasure that I notify you of Pub Whittier's marriage over a year ago to Miss Ruth Blunt of Boundbrook, N. J. Pub is with Congoleum Nairn at Markers Hook, where he functions as a plant engineer. He lives at 307 Urban Avenue, Norwood, Pa. Pub can probably tell us of the whereabouts and doings of Don Spitzli. By the way, Don is Secretary for Course X and we shall expect to hear from him shortly.

Ezra Stevens has recently changed his location from the Raytheon Company in Newton, where he was purchasing agent, to the Delta Manufacturing Company in Cambridge. We believe Ezra is still connected with Raytheon in his new position, however. Right around the corner from Ezra, the General Secretary still holds forth with the General Radio Company, doing mostly advertising and sales promotion work. Johnny lives in Weston and has a son three years old.

I had a pleasant surprise a few months ago. In calling on the Manchester Gas Company, I found that my business had to be transacted with Pete Norton, who is now superintendent of that gas plant. Prior to his Manchester job, Pete had been with the Consumers Gas Company, Reading, Pa., where he learned all the intricacies of gas manufacture and distribution. As you know, Pete was married during his senior year and is "daddy" of us all, having three or four children (Pete will have to set us straight on the number) and one full-grown moustache. Alden Reed has been transferred from the office of the Brown Company of Portland, Maine, to their Chicago branch. I used to run into Alden, frequently at the University Club on Saturday afternoons, as he evidently preferred Boston week-ends to those offered at Portland.

Jack Boyle is a superintendent for Coleman Brothers in Boston, and for several weeks I met him regularly, as one of their projects was going on outside my office. I believe Jack was married a while ago and I make this report as authentic. If I am wrong, Jack no doubt will be after me shortly. — Carroll Osgood is with Boston Woven Hose in Cambridge and I can only report that Carroll is a regular

1927 Continued

swimmer at the University Club pool. — Bill Reed is with the Koppers Products Company in Pittsburgh, in the Tarmac road tar sales department. Bill and I lived together in Pittsburgh for about two years. He is single but I do not know how long he will stay that way. Tom Barker is also with Koppers Products Company, doing engineering work at Seaboard, N. J.

Your scribbling Assistant Secretary is with the Koppers Products Company in Boston, selling coal by-products and coal tar derivatives. I have been here about two years, after having spent some time in Birmingham, Chicago, Pittsburgh, and Providence. My assignment to Boston resulted in my decision to take a wife and on June 25, 1932, I fell into the Benedict column. Some of the boys at our five-year reunion wondered why I willingly played on the married men's baseball team, but even Jim Lyles was unable to learn my intentions. I will say that he worked pretty hard to line up the situation, however.

It appears that a large majority of the fellows are interested in having class notes in The Review regularly. After repeated requests from Jim Lyles, I have agreed to assist the General Secretary, with the provision that I shall receive coöperation from other members of the class in the form of news and from the Course Secretaries in handling the news from the various courses. For your information, listed below are the last known addresses of the Course Secretaries: I and XI, Leroy G. Miller, New York Telephone Company, 218 State Street, Syracuse, N. Y.; II, David R. Knox, 15847 Stroepel Street, Detroit, Mich.; III, Leonard B. Riley, Smith Leases, Ohio City, Colo.; IV, Thomas E. Hegarty, Portland Cement Association, 10 High Street, Boston, Mass.; V, Edward T. Dunn, 315 East 68th Street, New York City; VI, Charles A. Bartlett, 94 Virginia Street, Portland, Maine; VI-A, Thatcher H. Mawson, Allied Engineers, Inc., 600 North 18th Street, Birmingham, Ala.; VII, George B. Darling, Jr., W. K. Kellogg Foundation, Battle Creek, Mich.; VIII, Harold Heins, 24 Floyd Street, Dorchester, Mass.; IX, Sydney D. Berman, 548 Salem Street, Malden, Mass.; X, Donald H. Spitzli, 732 Elm Street, Arlington, Mass.; XII, Richard W. Davy, Box 1509, St. Petersburg, Fla. (last known address, from which mail has been returned); XIII, Henry G. Steinbrenner, Kinsman Transit Company, 707 Rockefeller Building, Cleveland, Ohio; XIV, Nathan Cohn, Room 243, 116 New Montgomery Street, San Francisco, Calif.; XV, George C. Houston, David Houston Corporation, 60 Park Place, Newark, N. J.; XVI, Franklin T. Kurt, 105 Hyde Street, New Haven, Conn.

Will you please drop a line with all information about yourself that you will give us and also information about any members of the class that you have to your own Course Secretary, and if you feel sufficiently inclined to write two letters, I also shall be pleased to hear from you about you and about any members of the class with whom you are in touch. How about it, gentlemen?

This column is being written on January 23 and must be at The Review office on the 25th. Therefore, by the time this column reaches you, the closing date for the April issue will have passed. You can be assured, however, that there will be some news in the April issue. In May the situation is entirely up to you and, for that reason, if you want to keep the '27 column, please write to us just as soon as you have read this issue in order that the May notes may be a success. — JOHN D. CRAWFORD, *General Secretary*, General Radio Company, Cambridge, Mass. RAYMOND HIBBERT, *Assistant Secretary*, Room 920, Consolidated Gas Building, Boston, Mass.

1928

Al Pearsall paid a surprise visit to Cambridge during the latter part of January and spent the night at the home of Ralph Jope on Memorial Drive. Al is working for the Reynolds Metal Company of New York. The Reynolds Company is now producing a special kind of aluminum foil heat insulation called "metalation."

During a recent visit of Ernie Knight we were pleased to learn that Ev Lester, II, is now in charge of testing at the Pratt and Whitney Company, Airplane Engine Plant in West Hartford, Conn. Our congratulations to you, Ev, for your success in taking charge of this important work.

Production activities in the Westinghouse Springfield Refrigerator factory have absorbed most of Ernie Knight's daytime program. However, he did mention that he had taken up the hobby of riding old-fashioned bicycles for real novelty exercise and sport, and to Ernie himself we should like to suggest that after he masters the old high-wheeler variety, he might try "a bicycle built for two." — We need a little more heart interest in this column. — GEORGE I. CHATFIELD, *General Secretary*, 420 Memorial Drive, Cambridge, Mass.

1929

Another year has rolled around to complete our fifth year as alumni. Here's hoping that this one means more to us as alumni. Brig Allen and I are still exchanging correspondence relating to our reunion this summer or next summer with the All-Technology Reunion in 1935. In an earlier edition of The Review we asked for comments on these two propositions, hoping for an expression that would indicate a preference on your part. At present it is Brig's desire that we hold our own five-year reunion and not merge it with the All-Tech 1935 Reunion by putting ours off for a year. Before this Review gets to you, you will have received more definite information covering the reunion. There will no doubt be a reply card enclosed. If you have not returned that reply card up to the date of reading this column, please accept a suggestion to do it now. We need your coöperation and plenty of it to put over our first big reunion.

Brig writes that he saw Ted Ewald, XV_2, over the Christmas holidays and states that Ted is now working for a concern that gives advice on proper investments, doing statistical work which is right up his alley. Ted attended Columbia after losing his job in Cleveland and received his master's degree from that school.

Adam Stricker, Jr., IX-B, noted on the back of his Christmas card that he is now with the Public Relations section of the General Motors Corporation handling relations with the technical and scientific press. He also states that he hopes to get back to our five-year reunion.

Joaquin Llanso, II, sent his annual holiday greetings, but didn't add any word about himself. We can conclude, however, from his card that he is still with Worthington Pump. — Warren Spofford, II, writes his Christmas greetings from Schenectady, where we can assume he is still with General Electric. — Charlie Pease, XVII, sends his greetings from Boston. Bet Charlie made a wonderful Santa Claus when it came to sliding down chimneys for his young son. Just the kind of a job for a building construction engineer.

Ed Farmer, VI, sent his greetings from St. Johnsbury, Vt., where he seems to have settled since his marriage. — Rolf Atkinson, IX-A, sent his greetings from Rochester, N. Y. No further information was enclosed, but since Ralph was engaged in photographic work when he was last heard from in Boston, we can almost assume that he's now pursuing the art at its source.

Glen Andrews, X, writes that he and Ralph Crosby, X, are still working for Shell in the East Chicago refinery and remarks that it has been a fine place to stay during the depression, as refinery operations, though not profitable, have been remarkably steady. He notes that Al Hayes, X, is working for Standard Oil and lives in Hammond, Ind. Glenn also writes that he has been in on a few meetings on the subject of building up a lively Chicago Technology Club, but there seems to be a general lack of interest. That sounds like most other districts that I've heard of since the depression hit business so hard. He writes that Crosby and Hayes appear to be confirmed bachelors, but that he is happily married, has a two-year-old daughter, and is living in Hammond.

The engagement of Ted Malmstrom, I, to Florence May Catton of Watertown, Mass., was announced early in November in the Boston papers. The announcement also stated that Ted had been a civil engineer with Stone and Webster in the construction of the Osage Hydro-Electric plant at Eldon, Mo., and that he had recently received an appointment as junior engineer for the Bureau of Reclamation of the U. S. Department of the Interior at Denver, Colo. — On October 27, Ted Appel, I, was married in Maple-

1929 Continued

wood, N. J., to Elizabeth Charles of Spartanburg, S. C. They will reside in Narbeth, Pa. — Brig Allen also wrote that he had heard indirectly that Bill Aldrich, XV_3, was in Worland, Wyo., but he hadn't heard what Bill was doing there.

It is a sad duty to have to record the passing of two of our classmates at this time. Edward Michelman, VI, passed away December 25. There was no information forwarded regarding him other than the announcement. — Bill Thomas, XV_2, was killed December 14 in a plane crash in South Africa, near Eshave Natal. Bill was a passenger on the plane flying from Durbar to Johannesburg when it encountered rain and dense fog. An unsuccessful attempt was made to fly over the fog, then the pilot apparently decided to make a forced landing. While seeking a suitable place in the fog the plane crashed against a hillside, and four of the five passengers and the pilot were killed. Since graduation Bill spent some months working with American business firms with which his father's South African business was connected, returning to Johannesburg about three years ago. During the last three years he had been engaged in his father's business and for many months prior to his untimely death, Bill had been in sole control of the business. His successful management of affairs under the most difficult and trying foreign exchange and general economic conditions won him the admiration of a wide circle of friends. It is a tribute to Bill that one of these friends in Johannesburg, a Yale man of the Class of 1927, should write to us giving us Bill's life story. Bill is survived by his father and mother, who reside in Johannesburg. We extend our sincere sympathy to the families of these two classmates.

From Frackville, Pa., I received an interesting letter offering a news item of importance and an excellent, though surprising, suggestion. The news is of the birth of William Spencer Hutchinson, III, another future M. I. T. undergraduate, on September 6. He is the son, as you have probably guessed, of Bill Hutchinson, Jr., III, who is now associated with the Philadelphia and Reading Coal and Iron Company as an engineer with hopes of entering the metal field in the near future.

The surprising suggestion contained in the above letter announcing Bill's heir was by Bill's wife, who wrote the letter. Her suggestion was that some of the "better" halves (she called them "lesser" halves) might contribute information to these notes where the busy engineers cannot seem to find time to drop a few lines. If the '29 wives would take this suggestion seriously or if a few of the boys would request that their wives write us a few lines now and then, we would have very few blank months such as was the case last month.

Mrs. Hutchinson also writes that there are several M. I. T. men there with Bill's company making up a congenial group. That letter should start something, and if the girls accept the challenge, we'll have plenty of interesting news for years to come. — EARL W. GLEN, *General Secretary*, Box 178, Fairlawn, Ohio.

1931

I was very sorry to hear of the death of Robert Harkness, Jr., who took graduate work as a member of our class. His death followed an illness of two weeks.

I recently had a letter from Dave Buchanan, which follows: "Each month when The Review reaches me, I anxiously look at the '31 notes to see what has been happening to the old gang. And each month, I have also resolved to drop you a line to let you know that I am still alive, but you know what happens to such resolutions when not carried out immediately. Hence, I am starting this at once.

"I don't even recall when I last wrote, but since I am sure it is almost a year, I guess there are one or two little news items since then. I am still with Brooklyn Edison, having been transferred to the Commercial Engineering Bureau last spring (even though I still use the P A's letterheads). With an expansion of customer relations policy, that bureau took a number of men from other departments, and I was one of the fortunate transfers. The work keeps me outside most of the time, and I enjoy rambling about from customer to customer in the 'wilds' of Brooklyn a great deal. It is very interesting and leads to many worthwhile contacts on the outside.

"But of even more personal interest than the change in my work is that which took place in my bachelorhood on September 30 last. Yes, I too have succumbed, and married the sweetest little girl in all the world. She was Miss Dorothy Minners of Brooklyn. Following a trip to Asheville, N. C., we returned to Flatbush and have been in the process of settling down at the above address (125 East 19th Street, Brooklyn) ever since. And what a wonderful three months have just passed.

"As I think I have told you before, I rarely see any of the old classmates. Ed Worden called me up the other day, and he is still with Abraham and Straus in Brooklyn, but I don't think I have seen him in the past year. I would surely like to hear from any others who are around this old town. — Also had a Christmas card from Ed Hubbard and I find he is in Watertown, so if you run into him, Johnny, tell him I expect to write some day. — Yours for more and more news in The Review." Glad to hear that things are going so well, Dave, and congratulations on your marriage. I hope that you and Mrs. Buchanan will be very happy.

Met Bill Roberts not long ago. Bill is at the Business School at Harvard (a college in Cambridge). He reports plenty of work and progress. Also met Vito Cappelo, who is with the Grenada Wine Company in Cambridge. He tells me that Bill Jacobs is with the New England Distillers. I don't guarantee any samples, but there wouldn't be any harm in trying.

A couple of clippings from the news service bring the following information: Francis Weeks was married to Miss Elsie Crane Watkins in Milwaukee. H. Brooks Walker is now a student at the Kirksville College of Osteopathy and Surgery in Missouri. He is a member of the class of January, 1937. (Don't know what day in January.) He will graduate with a degree of Doctor of Osteopathy. If any of the boys are from that district and return home, look Walker up, he'll be glad to see you're back. — Percy Phelps was married to Miss Emily Pierce Rickey of Scotland and Michigan. It is rumored that Phelps knows his Scotch. A change of address for Joe Birdsell gives the address of Dun and Bradstreet in New York. I don't know whether Joe is working there or is just a stowaway.

Expect to attend the Alumni Dinner and should see some of the gang during the meat course. I'll let you know what I hear. — JOHN M. MACBRAYNE, JR., *General Secretary*, 55 Boylston Street, Watertown, Mass.

1932

I have received a letter from F. Rolf Morral (Vallingatan 37, Stockholm, Sweden) with which he inclosed an article about the presentation of the Nobel prizes this last fall. I enjoyed reading it but regret that space is not available to publish it. Elliot Whitaker has been back in this country for several months now. I met him in town one evening but as yet have not heard any news from him about Course IV.

As mentioned in Glick's letter, Bill Hall, X, was married to Miss Helen Louise Coats of West Roxbury, November 30. He is working for Atlantic Refining Company, Philadelphia, and they live at 7254 C Glenthorne Road, Upper Darby, Pa.

Ed Pfeffer, X, was married in November to Miss Estelle Janet Blaisdell of Brooklyn. They are now living at Oak Park, Chicago. My roommate, E. Allen Newcomb, IX, became engaged to Miss Katherine Purcell in December. — John Crowther sent me his new address: 5083 Waterman Street, St. Louis, Mo. I hope he will send in some news about our classmates in that section for a future issue. — CLARENCE M. CHASE, *General Secretary*, Chase D33, Soldiers Field, Boston, Mass.

COURSE III

Congratulations are in order for Bearce. No, he has not been married yet, or at least he has not said so, but not only does he have a job, but he has been promoted. Great work in such times! We reported some months ago that he was working for the North London Company at Alma, Colo., in their mill. He started as a table man and now has been promoted to ball mill operator and is right in line for shift boss. This is the first promotion among our ranks that is recorded and we send our good wishes for further success.

Tom Jones spent the summer as a beach guard, but had no success at the end of the summer getting into oil. He has, however, satisfied a life-long desire to become a sailor and is now being "rocked in the cradle of the deep" as a seaman aboard the steamer *George Harrison Smith* of the

1932 Continued

Standard Shipping Company, which is a subsidiary of the Standard Oil Company of New Jersey. He was in the New York office for a few days before getting a berth on the ship, and he has been promised a place in the engine room before long. Not bad at all for a fellow who likes the ocean.

Word from Orne still shows him unsettled. He has been living in Canton and has now moved up to Peiping to try things there. A spirit of uneasiness prevails with the Japanese at the Great Wall a hundred miles away, with the result that mining is at a standstill and jobs are scarce. He says the future of China is hopeful despite conditions, and much progress has been made during the last ten years. New roads have been built, railroads extended, land reclaimed, factories rebuilt, and, most important, the number of war lords decreased. Gradually a great change is coming over the country. He reports the Canton M. I. T. club is the most ambitious and spirited of all the college clubs in Canton. There are regular monthly meetings, and are always preceded by a regular 10 to 15 course Chinese dinner. He asks to be remembered to all his friends.

Berube has gotten his break, and has secured a job with the Noranda Copper Company at Noranda in the Province of Quebec. He is a mucker just at present, and we extend our good wishes to him in his mucking when the only icicles visible are those from liquid air and the only inhabitants ought to be polar bears. We understand there has been a good start already. I can sympathize with him 'cause I stood on a blast furnace at six above one night and that was bad enough, but maybe when another 30° or so are knocked off and the thermometer goes in out of sight, you become so numb you do not notice it. Good luck to you, Berube.

Tom Hartigan drove a truck for U. S. Rubber for eight months, and then gave it up during the summer to become Secretary for the Standard Beer Sales Corporation, one of the largest beer distributors in Connecticut. He was also recently elected Secretary of the New Haven County Technology Club.

At present Lambert and Haynes are chasing jobs and there are definite hopes of catching up with one before long. There are still many not represented on the files and some word from them as to their doings, even though they be still walking the streets, will be interesting. Let's go, fellows! — HENRY J. CHAPIN, *Secretary*, 59 North First Street, Duquesne, Pa.

COURSE X

I met Mel Castleman and George Root at the New Year's Business Conference at M. I. T. The former is with the Bay State Chemical Company, manufacturers of leather finishes, and the latter is on lab and control work at the Danvers Bleachery. They said that Buckley is with the Evans Case Company. They make cigarette cases and such.

I received the following swell letter from Les Glickman and shoot it along with the hope that some day one of you may do likewise by me: "Perhaps you would welcome some news about our Course X comical engineers. Having been around Tech quite often, I found out what some of the gang are doing at present. Jim Abbot, whom I met in the Walker Gym recently, said he is working in his father's wool business and is located somewhere in New Hampshire. Another one of the bunch who is also occupied is Johnnie Brown, who is holding down a job with an oil company in New Jersey. Brownie is with Cities Service, I believe, and is living at 15 Raymond Terrace, Elizabeth, N. J. I received a Christmas card from him which divulged his present address, and I wrote him a letter to find out more definitely how things are going. I'm sure Brownie would be glad to hear from the other fellows, too.

"William Anthony Hall, the sheik, has gone and done it! Yep! He got married. This great news was furnished me by no less a reliable source than 'Wild Bill Hall, Sr.,' the illustrious analytical expert, whom Course X guys never forget. I met Professor Hall a few weeks ago, and he also informed me that Bill is working, but I can't remember where. Also, I was recently told that Al King has become engaged, but cannot swear to the authenticity of this item. I think Al is working in Rochester, N. Y., but as before, this information was gained unofficially. (Not by Winchell tactics, either.)

"My luck in getting employment has not been so hot. A few months ago I landed a quasi-job with Keystone Manufacturing Company of Boston, who make steel toys. My work was in the assembly department and was pure putrid. The job only lasted several weeks, as the company had already been guilty of overproduction, and before Christmas arrived, they discharged all the routine help. I'm back in the army now, and am starting another campaign for employment." — WILLIAM KIRKPATRICK, *Secretary*, 35 Orchard Street, Portland, Maine.

1933

I ran into Paul Petitmermet up at Columbia the other day. He has deserted the ranks of civil engineers for a while and is working for his master's in the Department of Political Science. He has recently also made connections with a textile firm. He is sales representative for the concern during the day and continuing at Columbia in the evening.

Paul also gave me a line on a few of the other fellows. Gene Nedbor and Dick Payzant are working for the City of Boston. Rudy Rosas is working with a contracting firm in Mexico City. He has recently been up to Boston. — Ed Paterson is Engineer for the Town of Stoughton. Bill Gray is back for more at the Institute. Alex Nichiporuk is with the C. C. C.

Word from Cambridge tells me definitely that Raff Faulkner is in Peru, South America, with the Cerro de Pasco Copper Company. We are sure spreading out. — GEORGE HENNING, JR., *General Secretary*, 163 Barbey Street, Brooklyn, N. Y.

COURSE X

A good part of these notes must be repetitions, or at least an elaboration of last time's. My natural inertia has prevented me from getting out the contemplated circular letter to everyone so all the dirt will appear here.

Lobdell, Partridge, Kressman, Glenn, and Cirker are back from their durance at Bangor, sort of laughing at the graduate students in straight X, inasmuch as X–A has no exams rolling up on them at mid-term. I had a talk with some of the boys who were at the practice station, and they all seemed to be united in saying that Buffalo was the most interesting and spectacular. I dropped into a classroom between hours and there was Twomey, all in a sweat, with an equation on the board, trying to prove something to Dillon and Netherwood. It gave me a mixed feeling of homesickness and relief. I had a talk with Elmer (Professor to you) and with Sherwood. I learned, incidentally, that Course X was the only course to substantially increase its enrollment, 11 more having registered than last year.

Len Lindsay writes: "Since July 26 I have been a spare hand on the paper machines at Bird and Sons, Inc., East Walpole, and am still working there. Before going to work I took a trip to Dayton, Ohio, Louisville, and the World's Fair. On Friday, September 29, I decided to get married and on Saturday I was married to Miss Cornelia Lunt of Denver, Colo. We have an apartment in Newton Highlands.

Dick Gorman, after finishing up his work at Tech in October, started work on November 1 at Carbide and Carbon, South Charleston, W. Va. — Bobby Smith, who hasn't been near ground since his engagement, and is higher in the clouds than ever now that the fatal day of February 3 approaches, writes the following: "I'm happily busy. In fact, Bill, I've never in my life gotten so much kick out of being on the jump every minute. Believe me, it's a different kind of 'being busy' than working to keep 6:85 reports up to date and the thesis finished on time. Who says it's a cold, hard, bitter world when college dumps you out of its kind embraces? Horsefeathers, or worse."

I know more or less by now what most of you are doing, and have passed information along to you, but now is the time for a more detailed account of everyday doings and happenings. Write me a letter — the long, rambling kind — telling me just what you do on your job, or, just how you go about loafing, or what graduate courses you are taking, and what they are like. From now on, this section of the class notes will merely be excerpts from letters, so make them good — and long. — WILLIAM E. RAND, *Secretary*, 273 Union Avenue, Framingham, Mass.

COURSE XIV

The Sprague Specialities Company is employing the service of Werner Bachli. They make nothing but condensers and

1933 Continued

Werner is engaged in research work. When I heard from him, he was working on methods to reduce corrosion in the electrolytic condensers. He tells me that Gene Lynch '32 and Joe Collins '29, both Course XIV men, are employed in the same plant. He also passed on the rumor that Bill Murphy is an engineer with the C. C. C.

I have no more news of others in the course beside that which I mentioned last time. I am still in Reading and working like hell. I did manage to get away New Year's to visit Bill Pleasants in Philadelphia and saw some of those strange creatures known as Tech seniors. It was good to see them, too. — OTTO A. PUTNAM, *Secretary*, Althouse Chemical Company, Reading, Pa.

COURSE XVII

After deep and meditative study, a conclusion arises from the depths. Half of XVII is hibernating. Wonder of wonders! Sully's still. But Tom's engineering for the City of Haverhill (yes, Massachusetts), the Colonel continues his painting, and Don is busy letting contractors go to work around New York, and I'm making out reports for some of Don's colleagues at Fort Monroe, Va. So much do we know; the others are asleep.

This Colonel isn't a very coöperative fellow. I write that the women around here aren't so much to look at and he comes back asking me what I want him to do about it. He wishes me luck and hopes I get to Hollywood on the next jump horrors!

But really, he isn't so bad. He's complaining about the climate — well, why doesn't he move away from Lexington? And speaking of weather, Tom reports that he was running a transit at eight below. He also writes that he has a new respect for "curves" since he's laid out about a "million of 'em" for the city engineer. We all knew he had an interest, now it's a new reaction.

Galvin is making out all right, so he says, and at last report he was one of a party all of whom are Tech men, '31,'32 and '33. Is he learning to take it? Just listen to this: "Any day when it's more than 10 it is considered warm by us now. For eight days in a row we worked outdoors and the maximum temperature was 25. The spikes we use for pins bend over when we try to drive them in the ground." Now let's have somebody's tale to beat this one, but I don't know whether I'd want to beat the story of this truly "Tough Guy."

Don writes on official stationery but not on "official business" and affixes a three-cent stamp to the letter. He's working for the Constructing Quartermaster at New York City and having a busy time of it. Starting a job requires something more than a wheelbarrow and a few shovels, he learns. It includes: advertising, opening bids, awarding contracts, getting plans, and actually starting work on a number of jobs, which keeps him busy. And then to top everything, the chief clerk at his office had an accident and taking over her work kept him on the jump.

Ed Rowell stopped over to see Don some time ago, and we learn that Mrs. Rowell, senior, is making Ed wear a hat. Such is dignity. Outside his office things are calm for Don. Uncle Sam continued the 15% pay cut.

For me things roll along smoothly enough; our nine houses are all under way and I'll be here till June at least. The most remarkable feature of the work is the number of reports required by the officer in charge. I'm getting my experience, so I have been told, and it isn't at all unpleasant, but I do wish it would get warm again. — BEAUMERT WHITTON, *Secretary*, Box 173, Hampton, Va.

COURSE XVIII

The only person I can seem to get any dope on is Avakian and he is at M. I. T. taking a course for a master's degree. I am, and have been, working for Laidlaw and Company since the 30th of June as order clerk and customer's man, and it sure is swell fun and a grand job. Hours ten to three and very interesting. The business is rather slow, at present, but still holds on. Send me some of your money and I'll invest it for you! — LEONARD B. GIFFORD, *Secretary*, Box 391, Boston, Mass.

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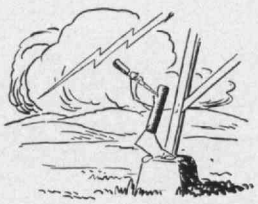
1. Airplane View of Main Educational Group.
2. Pylon of Building One.
3. Dome from Eastman Court
4. Walker Memorial
5. President's House
6. Pratt School of Naval Architecture and Marine Engineering
7. Rogers Building on Boylston St.
8. Dormitories in Rear of President's House
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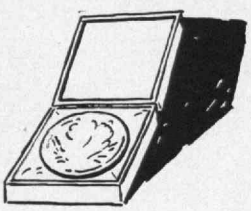
G-E *Campus News*



LIGHTNING SPIES

How many amperes are there in a bolt of lightning? Well, there are too many for comfort, and most of us are willing to let the matter rest there. General Electric engineers, however, were very much interested in knowing, so that they could better protect electric transmission lines and equipment from damage by lightning. And last summer they sent out over 2000 little spies. These spies are metal cartridges, hardly an inch long, which were placed on the legs of transmission towers on lines in Pennsylvania and Virginia. This territory is apparently one of lightning's favorite hangouts. When the surge from a lightning bolt passes through a transmission tower, the little spy is magnetized in proportion to the highest current in the bolt. Linemen carry the magnetized spies back to headquarters, where, when placed in a "surge crest ammeter," they tell their story. Many scores of the little spies have reported, and their stories are really shocking. The highest reading has been 60,000 amperes.

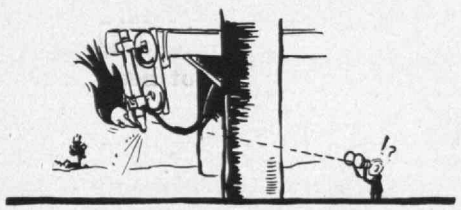
Clifford M. Foust, Carnegie Tech, '21, and Hans P. Kuehni, Ecole Polytechnique Fédérale, Zürich, '20, of our General Engineering Laboratory force, were responsible for the spies and the meter to make them talk.



KEYS, MEDALS, AND RESEARCH

The engineers and scientists of the General Electric Company have individually received many keys of honorary societies, medals, and other tokens. On February 1, however, General Electric received a medal to hang on its collective chest. The donor was the 100-year-old American Institute of the City of New York. And the citation read: "For pioneering in industrial research . . . for great achievements in pure science that have furnished gainful occupation for thousands of workers and that have raised the standard of living, and increased health and happiness."

We mention this with pardonable pride, fully aware, however, that medals and honors are not the purpose of research. The real purpose is the discovery of fundamental facts at the border line of man's knowledge. The practical applications are worked out later. It was with this conviction that Dr. Willis R. Whitney, M.I.T., '90, Ph.D., Leipzig, '96, now vice-president of the company, in charge of research, organized the G-E Research Laboratory in 1900. In maintaining this tradition, he is ably assisted by Dr. W. D. Coolidge, M.I.T., '96, Ph.D., Leipzig, '99, the present director; Dr. Irving Langmuir, Columbia, '03, Ph.D., Göttingen, '06, last year's winner of the Nobel prize in chemistry, associate director; Dr. Saul Dushman, U. of Toronto, '04, Ph.D., '12; and Dr. A. W. Hull, Yale, '05, Ph.D., '09, assistant directors.



SOUTHERN SLEUTHING

Not since Cock Robin have our feathered friends figured in a real good mystery, until the other day. And this was not so much a case of violence as of mistaken identity. Down in South Carolina, a power company had been having a little difficulty. It seems that the cutout fuses, which serve the same purpose on electric distribution lines that fuses do in our homes, were blowing out without apparent reason. Finally, an engineer with a Bird Club in his past unraveled the mystery. He saw a bird pecking at the soft fuse wire, apparently having a fine time. (It wasn't a G-E fuse.) Breathless investigation showed that other circuits had been opened in a like manner.

A G-E salesman on his next call recommended our new fuse links. Having copper in that part which the birds attacked, they proved to be im-peckable, and the trouble ceased. Now the birds are concentrating on worms, the power company on G-E fuse links, and everybody is happy.

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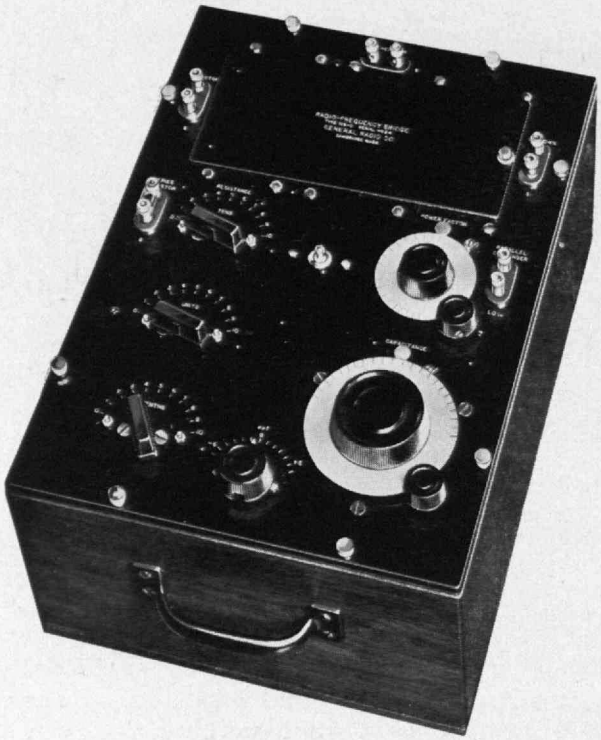
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